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Problems of a Kindred Industry

RESEARCH in the gas industry is conducted partly by the larger gas undertakings individually, and partly by the Institution of Gas Engineers, the latter working generally in collaboration with the Livesey Professor at the University of Leeds or with the British Refractories Research Association. At the autumn research meeting of the Institution, the seventh of which was held last week, reports on the year's work of the several formal research committees are presented and discussed and individual gas undertakings which have done work of special interest bring it forward. Some of the research reports are not of particular moment to the chemical industry, but there are usually several matters of interest to the industrial chemist.

The gas industry fosters schemes for the education of those entering the industry and for the further education of the young men as they rise in status. The industry can only flourish if it is staffed by men of the highest training, assisted by others who have been thoroughly instructed in the technique of their jobs. Attendance at classes, both day and evening, is encouraged and the Institution of Gas Engineers itself gives diplomas and other certificates to those who are proficient. Perhaps there is a moral in this for any in the chemical industry who do not adequately cater for the training of the younger generation. Gas undertakings consider that if a man be ill, arrangements must be made to carry on his work while he is away; in the same way the semi-trained man is regard as "ill" until he has completed his course of training. When it seems desirable that he should attend day classes, he is treated as if he were ill—"if we do not do this," say the spokesmen of the industry, "it is the industry that will be ill."

A curious difficulty has been met for some time in purifying gas from H_2S. It is well known that every gas company is liable to heavy penalities if any sulphuretted hydrogen be found in the gas sent out to consumers. When clean gas is stored in water-sealed holders it is occasionally found that it picks up H_2S. This has only happened since gasworks began to remove naphthalene from their gas, the naphthalene washers being put at the holder inlet. The cause of the trouble has now been traced to the action of sulphur bacteria. These bacteria were killed in water containing naphthalene, but when the naphthalene was removed before entering the holder, it disappeared and the bacteria flourished. They attacked the sulphates in the water and formed H_2S. So long as any sulphates remained in the water, so long were bacteria active. Oxidation of the water only reformed sulphates and the trouble began again. The remedy has been to remove sulphates from the water entering the holder. Quite strong phenols do not appear to have any action, and nothing other than naphthalene will kill this particular bacteria without at the same time destroying the metal of the holder.

A great deal of experiment has been made upon the cause of the corrosion of gas appliances and upon the scaling of mild steel in various furnace atmospheres. These two researches, although different, are related in so far as it has been to the sulphur in the gas—which only amounts to some 25 grains per 100 cu. ft.—that both actions have been largely ascribed. It has been found that even with a completely sulphur-free gas, there is corrosion of the gas appliance and this has been previously traced to the presence of very small traces of oxides of nitrogen, forming in the outcome nitric acid. In the same way, the scaling of steel in the reheating furnace is due to the oxidising action of carbon dioxide and water vapour, but in particular oxides of sulphur have been found to be ten times more powerful as scaling agents than oxygen itself. The moral is that for all operations where the furnace atmosphere is important and where traces of sulphur are deleterious, purified coal gas should be used.

The ammonia problem is still worrying the gas industry as it has done since the rise of the synthetic ammonia processes. Actually the industry has little cause for discontent with its bargain with the synthetic producers in spite of the low prices obtained. There is at least a little profit in ammonia now for some works, though many are still removing it at a loss. An attempt is now being made to discharge crude ammonia liquor directly down the drains to the sewage, in spite of its deleterious character. Large scale experiments are being made at Leamington sewage works and these seem likely to be successful even when the crude ammonia liquor amounts to 0.5 per cent. of the total sewage. No doubt many chemical works which have an effluent liquor problem will be interested in the possibilities that are being opened of direct co-operation with the sewage authorities in the disposal of their trade waste. There is a disposition to endeavour to replace sulphate of ammonia by ammonium bicarbonate. At present large scale agricultural tests have not decided the question of the value of the bicarbonate as a fertiliser. The CO_2 necessary is contained in the gases from the carbonising plant so that it is unnecessary to buy sulphuric acid. It is claimed that the cost of production of ammonium bicarbonate will be well below that of sulphate of ammonia, but the process has not yet been introduced on the works and commercial scale in this country.

Notes and Comments

Chemical Elixirs of Life

THE Jubilee Lecture delivered to the Society of Chemical Industry on " Chemical Elixirs of Life," by Professor I. M. Heilbron, last week in the Chemical Society's meeting room, was a success in every way: perfect in form, substance and delivery. The room was more than crowded and the audience did its worst to suffocate itself. The extent to which it was hypnotised was shown by the rapturous applause at the end. Few can have understood the nature of the fire projected at them, let alone the formulæ. Had the Headmasters' Association been the audience, not a man would have understood a word. Yet the lecture was about things which concern us more than anything else with which we have to do. The elixirs considered were the strange substances thrown off by Nature, which are become directive forces in our lives—the sexual hormones and the still mysterious bonemaker, D, misnamed Calciferol: Sterols all, common to which is a remarkable winged phenanthroid complex. Professor Heilbron is the perfect lecturer—he uses his lips and makes his words single and complete. His pronunciations should be noted before the B.B.C. interfere to make mispronunciation popular. Chole-sterol was so-called, not cho-les-terol, though here an occasional lapse into the vulgar was to be detected. Ergo(ergot)sterol, however, was never spoken of as er-gos-terol, a villainous distortion not unfrequently used. The story told was of the almost miraculous insight into structure now achieved by chemists. In Germany, workers have had works behind them. To our shame, be it said, the lecturer made no reference to such assistance being given here. English workers are forced to rely upon themselves—the greater the credit that is their due.

A Technical Information Bureau

A FEATURE of modern industrial organisation is the development of research associations, the aims of which are in general to improve the products into which their materials enter and develop new uses for them. Progress is based essentially on fundamental research in the laboratory and is greatly facilitated by a technical information service. The activities of such a bureau are described in a recent publication of the International Tin Research and Development Council (" The Functions of a Technical Information Bureau," by Dr. E. S. Hedges and Dr. C. E. Homer). The qualifications desirable in the personnel are research experience coupled with a practical outlook and capacity to appreciate the full significance and relative importance of information received from numerous sources. By studying the requirements of industry and the trend of research in other fields the bureau becomes not merely a storehouse of information but also a valuable research instrument.

The collection and selection of information necessitates familiarity with every aspect of the work of the organisation. Sources utilised are technical and scientific periodicals, abstracts and papers, and patent literature. Trade literature, photographs, personal contacts and correspondence are full of value for the same purpose. Effective distribution of the specialised information to the appropriate research workers and to industry is achieved through several channels. Technical inquiries from industrial organisations, research associations, manufacturers and others from all over the world are answered in collaboration with a director of research and the co-ordinated assistance of various sections of the organisation. Since the widest distribution of information can be achieved through printed reports, monographs and bulletins, the publishing of these is also a phase of the work of the bureau.

Chemists Getting Together

IN view of its far reaching possibilities, it might have been expected that the agreement reached early this year between the three senior chemical organisations for extended co-operation would have been more generally discussed by the members concerned during the present session, but we have so far looked in vain for any reference to it outside one or two noteworthy presidential addresses. Mr. G. A. Campbell, who made the agreement a feature of his recent presidential address to the Oil and Colour Chemists' Association, urges that the specialist bodies should take notice of this " get together," not as a measure of defence, for there is as yet no effort to influence, but as a sincere effort to find what steps are necessary, first to dignify the profession of chemistry, and secondly, to promote the specialised interests of the industry they themselves serve.

Meanwhile there is a noticeable growth in the provinces of attempts to co-ordinate local affairs among chemical organisations, as instanced by the joint committees in Manchester, Birmingham, Newcastle and Glasgow. It is true that their aims are restricted essentially to preventing overlapping of local lectures, economising on annual syllabuses and arranging joint meetings, but they certainly show a desire among the rank and file for some greater measure of co-ordination, to curtail the number of meetings, to arrange for borderline subjects to be dealt with at joint meetings and to economise on secretarial work so that eventually there may be reduced composite subscriptions. We are convinced that the desire for co-operation, if not for unification, is greater in the provinces than it is at headquarters, and it may be that the steps already taken at Manchester and eslewhere will be the basis on which real co-operation will ultimately be achieved.

The Annual Chemical Dinner

MENTION of friendly relations between chemical organisations inevitably brings to mind the annual chemical dinner, a remarkable institution not sponsored by any individual society but regularly and enthusiastically supported by the members of at least fourteen of the principal organisations concerned with the profession and industry of chemistry. The dinner grows in popularity each year, and it is expected that last year's record attendance will be exceeded at the Wharncliffe Rooms, Hotel Great Central, on December 17. Mr. F. A. Greene, the immediate past-chairman of the Chemical Club, is again organising the dinner this year.

Plasticity and the Coal Industry

Briquetting With and Without a Binder

COAL is in many ways the " open sesame " of the plastics industry, said Mr. W. Idris Jones, research manager to the Powell Duffryn Associated Collieries, Ltd., in a paper on " Plasticity and the Coal Industry," read before the South Wales Section of the Society of Chemical Industry, at Cardiff on November 8. The plasticity developed by coal under the action of heat, he continued, has led to the development of the briquetting and carbonising industries, and the carbonising industry is still one of the main sources of raw phenolic and other materials for the manufacture of plastics. Furthermore, the catalysis of water gas under pressure yields methanol and the catalytic oxidation of methanol produces formaldehyde, another important reagent for the production of industrial plastics.

Effect of Heating

The hardness of coal at ordinary temperatures precludes the formation of plastic masses, but considerable plasticity is developed on heating. This varies with the type of coal. The temperature of incipient plasticity of coal rises with increasing coalification (*i.e.*, decreasing volatiles), while the temperature range within which the coal is plastic becomes smaller with increasing coalification. When coking coals are gradually heated, certain fundamental molecular changes begin at about 350-400° C., gas and steam are evolved, the coal structure is loosened and the particles soften and cohere to form a plastic mass which can, in some instances, be forced through small orifices.

At the commencement of the plastic stage the variable quantity of molten or fusible material which is present supplies a freedom of movement and adjustment in the coking charge and functions as a binder. It also exerts a peptising action on the rest of the coal, compacts the small pores and interstices in the remainder of the coal grains and thereby restricts the evolution of gas from the interior of the individual coal particles. In consequence, the internal gas pressure builds up to such an extent that the fluid present is extruded over the surface of the solid particles, forming a more or less uniform mass.

A Necessary Condition

It is a necessary condition that in order to produce a good coke there must be enough fluid matter present of the requisite wettability and the internal gas pressure must be high enough to spread the molten material over the adjacent solid particles and bind them together. Plasticity is well marked at about 400° C. and at this temperature the quantity of fluid matter and its fluidity will have increased. It will therefore peptise still more of the ulmins or solid matter and give an increased cementing action. At about 450° C. the mass begins to solidify, due to thermal decomposition of the fluid binder, and with practically all coking coals the plastic stage is passed at about 500-550° C. The greater the loss of volatiles produced by the solidification of the plastic mass, the greater will be the resulting contraction and formation of cracks. Conversely, if insufficient decomposition occurs after solidification, contraction and fissuring will be reduced, but this will cause a risk of adhesion to the bottom and sides of the oven, followed by difficulty of discharge when coking is complete. Coking coals normally have an excess of plasticity and they can therefore accommodate as fillers a certain limited percentage of inert material or non-caking or feebly-caking coals or coke dust, the amount of added ingredient being again largely determined by its size and plasticity.

Fine grinding of the charge coal increases the homogeneity and compactness of the mass and the rate of heating is also a controlling factor, narrow ovens yielding more favourable heat transfer than wide ovens. The addition of feebly-caking coal depresses the plastic curve of the coking constituent and the effect increases as the percentage of added ingredient and the time and temperature are increased. Weathering and oxidation have the same effect.

From the rational standpoint it is likely that the resins, hydrocarbons, plant skins and dispersed ulmins are the primary cementing factors, but they are probably influenced by the physical condition and nature of the undispersed ulmins, spore exines, cuticles and resistant wood structures which predominate in the coal. The main decomposition during the plastic stage is that of the ulmins. Other fused or fusible bodies are also formed during heating. Hydrogenation greatly increases the plasticity of coal, and converts non-caking coals into caking coals, primarily by the removal of oxygen. This suggests that the oxygen content of the ulmines is the key to the plastic character of the coal. The phenomena of thermal plasticity of coal are useful in studying different blends of the same coal or similar coals and for indicating the effect of oxidation, etc.; but some coals are exceptional and it is therefore not possible to predict the quality of the cokes produced from dissimilar coals on the basis of plasticity data alone. Other operating factors must also be studied.

Briquetting at Atmospheric Temperature

At very high pressures nearly all powdery materials can be briquetted at atmospheric temperatures, *e.g.*, anthracite dust can be compressed at pressure of 50-60 tons/sq. in. to yield strong briquettes having the characteristics of lump coal. Similarly, brown coal can be briquetted directly at pressures of 10-12 tons/sq. in. to yield strong briquettes. This compares with the normal pressures of up to 2 tons /sq. in. necessary in the normal coal briquetting process when using a binder. Coal, to a greater or smaller extent, possesses plasticity when heated and in this condition it is merely necessary to apply sufficient pressure to obtain a briquette of the necessary qualities.

All coals may be regarded as consisting of two main constituents—the visible vegetable debris and a colloidal amorphous paste enveloping and cementing the vegetable debris. It is due to the plasticity of this paste on heating that recent developments in briquetting technology are due. Briquettable brown coals or lignites and pretreated peat possess a plastic gel property to a high degree but low volatile coals or anthracites, being feebly plastic or non-plastic on heating, are not themselves amenable to direct briquetting; they must be mixed with a binder or with caking or plastic coals, which, in the plastic range, can serve as excellent binders. A dense briquette can be obtained from a suitable coal even without heating to the plastic limit. An increase of temperature up to the decomposition temperature increases the strength of the briquette and lean coals will require higher temperatures than caking coals or gas coals. Briquettes of non-caking coals, at the same temperature of compression, have a much smaller crushing resistance than those made of caking coal and the crushing strength of briquettes made from a mixture of caking coal and non-caking coal increases with increasing percentage of the caking constituent.

Presence of Fusain

As far as the petrographic constituents of coal are concerned, we may state definitely that the presence of fusain is harmful in briquetting because it reduces the plasticity on account of its chemical and physical properties and cellular, tenuous wood charcoal structure. In the same way a high ash content is disadvantageous.

Many processes for the direct briquetting of coal are now being developed on the large scale. Some work is being carried out nowadays on the so-called " colloidal " briquet-

ting of coal. This process is best suited for materials like brown coal or peat, although dispersions made from brown coal or peat can be used for admixture with low volatile coals. For a hydrophobic material, such as coal, the usual binders used are asphalt, pitch, coal tar pitch and tar fractions. Clay, cements, sodium silicate, sulphur liquor, molasses, starch, dextrin, flour, casein and pulp binders from treated vegetable material, etc., have also been used.

In the normal classical briquetting process fine coal is mixed with disintegrated pitch or bitumen and heated by means of superheated steam to about 95° C. The binder is thus softened and smeared over the coal particles by means of paddles. The plastic mass of coal and binder is then pressed into briquettes at about 70-80° C. and pressures normally up to about 2 tons/sq. in. The main problem in briquetting is therefore to attain the requisite degree of plasticity in the briquetting mixture and the requisite cohesion strength in the finished briquette with the minimum consumption of binding agent and of power, etc.

A Determining Factor

When a binder is used the strength of the briquette and the consumption of pitch are largely determined by the fineness of the coal. With an excess of coarse particles the correct texture cannot be obtained because too many cavities are present and therefore more binder will be required. Furthermore, the layer of pitch between the coal particles will be too thick because it lowers the adhesion tension. If the coal particles are too fine, the influence of the non-spherical shape decreases, the interior surfaces between pitch and coal are smaller in area, the firmness of the mass is reduced and there is a falling off in strength owing to the large increase of surface to be wetted by the binder. Therefore it may be concluded that a coal of medium fineness is best and no more fines should be used than is necessary to fill the voids. Probably the best grading of coal to use is from 10 mesh to 200 mesh size. The presence of ash and other mineral substances may reduce the plasticity and increase the pitch requirements and operating temperature and pressure.

For each quality of coal there is an optimum moisture content corresponding to minimum pitch consumption. As far as the petrographic constituents are concerned, we may state that bright and dull coal do not appear to show definite differences in briquetting properties and that fusain is harmful. Fusain acts unfavourably on the binding qualities of the pitch and in view of its cellular structure it increases the pitch consumption. However, moderate amounts of fusain (less than 5 per cent.) do not appreciably affect the strength of the briquette. Another important factor is that peptisation of the bitumen constituents of the coal in the softened pitch under pressure and at elevated temperature may occur to a greater or less extent and cause the coal to lose its texture.

Pitch Requirements

As far as the rank of the coal is concerned it may be stated that the pitch requirements are decreased as the volatile content of the coal increases. The strength of the briquette increases with increasing volatile content of the coal, but this increase is the only slight in the 5-20 per cent. volatile range; above that the strength increases very rapidly with increasing volatiles. The quantity of pitch required varies with the nature of the coal and with the strength required in the finished briquettes.

The value of a briquetting pitch nowadays is judged mainly by its softening point, its coking residue, its " free carbon " content and the percentage of solvent extract. Ash content and coking residues are of little technical value because a variation in these hardly influences the binding power of the pitch and the briquetting process has nothing to do with coking. The softening point of pitch also is no more definite than the specific gravity of motor spirit. In general, however, the pitch used melts between 55° C. and 75° C. " Free carbon " is a guide to the percentage of pure bitumen, but " free carbon " and " softening point " do not adequately reveal the suitability of a pitch any more than proximate analysis affords an indication of the coking properties of coals. For equal binding power the more grindable and finely divided the pitch the better. High ductility is also essential. A factor which is of paramount importance is the fluidity of the pitch at the mixing temperature, because this determines the degree of wetting and uniformity of coating of the coal particles.

By solvent extraction pitch can be divided into three main fractions: (1) *Alpha*—insoluble in benzene and light petroleum; (2) *beta*—soluble in benzene and insoluble in light petroleum; (3) *gamma*—soluble in benzene and light petroleum. The beta and gamma fractions are the carriers of the binding power, the ratio of beta to gamma being unity in good pitches and accounting altogether for about 80 per cent.

Twenty-Five Years Service

Luncheon to Mr. H. B. Crole-Rees

TWENTY-FIVE years' service to Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, by Mr. H. B. Crole-Rees, the present managing director, were celebrated on November 8 at a luncheon held at the Savoy Hotel, London. The lunch was given by Sir Ernest Benn, J.P., chairman of the company. It was attended by Lady Benn, Mrs. Crole-Rees, the directors of the company, and the editors and publishers of the 15 Benn journals.

Sir Ernest Benn presented Mr. Crole-Rees with a replica in silver of Bouverie House, the Fleet Street headquarters of the company. Paying tribute to Mr. Crole-Rees's work for the firm, Sir Ernest referred to the fact that in three years' time he himself would be celebrating his 50th anniversary with Benn Brothers. He recalled the time when a youth strolled into the Christopher Street premises of the firm and, having applied for a position, was set to work on the "Export World," transferring a year later to the " Cabinet Maker." Sir Ernest recalled the spirit which then animated members of the company, who all felt that they were on a " sort of month-to-month arrangement until death do us part." " I have never had a better friend than Crole-Rees," Sir Ernest continued. " He has been a wonderful colleague, a good sportsman who knows how to play the game of life. He is truly 'a man who warms both hands at the fire of life'."

Mr. Gordon Robbins, deputy chairman, also paid tribute to the friendship he had enjoyed with Mr. Crole-Rees for 15 years, not only in business but also in a personal capacity. " One of his greatest assest," said Mr. Robbins, " is his sense of personal loyalty." Twenty-five years was a wonderful innings for a business-getter.

Mr. Glanvill Benn, a director, claimed that courage and determination were among Mr. Crole-Rees's foremost qualifications. These were virtues which received too little appreciation to-day.

Mr. Crole-Rees, in his reply, presented an entertaining sketch of his 25 years' association with the firm. He traced the growth of the company from its position as a concern with £10,000 capital when he joined it until to-day when it had a capital of no less than £250,000. One of the most treasured letters in his files, said Mr. Crole-Rees, was one from the late Sir John Benn. In 1919 the founder of the firm wrote expressing his pride in the fact that the " Cabinet Maker " was one of the very first trade papers to be produced on genuine publishing lines. Almost all the leading trade papers, even at that time, had started as trade catalogues. Mr. Crole-Rees referred particularly to the part the " Cabinet Maker " played in the war, when twice a month a special section was devoted to aircraft activities. He concluded by thanking Sir Ernest for the presentation and by expressing his satisfaction at the coincidence of the honour conferred upon Sir Ernest by his election as president of the Advertising Association with his own celebration of his 25th anniversary.

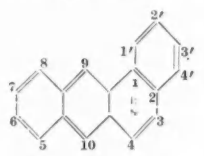
Carcinogenic Hydrocarbons

Dr. J. W. Cook Delivers a Bedson Lecture

CARCINOGENIC hydrocarbons and their biological effects were the subject of the 31st Bedson Lecture delivered by Dr. J. W. Cook at a joint meeting of the Institute of Chemistry (Newcastle-on-Tyne and North-East Coast Section) and the Bedson Club, at Newcastle, on November 8.

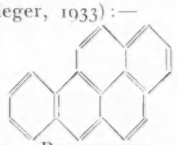
The cancer-producing action of coal tar, said Dr. Cook, was clearly due to certain constituents or groups of constituents. Examination of the many known constituents gave consistently negative results, but valuable clues were provided by the investigations of Kennaway (1924), who showed that the tars formed from isoprene and acetylene at high temperatures, in an atmosphere of hydrogen, gave strongly carcinogenic fractions. The problem entered on its next phase when Mayneord (1927) made the observation that divers carcinogenic tars and mixtures all showed three characteristic bands in their fluorescence spectra, situated at 4,000, 4,180 and 4,400 A.° This suggested that the constituent of these mixtures responsible for their carcinogenic activity was also that which gave rise to the characteristic fluorescence spectrum. In this way it came about that a study was commenced of the biological and fluorescent properties of a series of complex aromatic hydrocarbons related to anthracene, a molecule well known to be associated with powerful fluorescence.

Investigation of a fairly wide range of homologues of 1 :2-benzanthracene has shown that carcinogenic properties are usually shown by compounds having substituents at positions 5 or 6, or both these positions, but rarely by compounds with substituents in other positions :—



1 :2-Benzanthracene.

A systematic fractionation of two tons of coal tar pitch was carried out by Hieger, who used the fluorescence spectrum as a guide in the selection of fractions for further treatment. By fractional distillations, solvent extractions, crystallisations of picrate, and finally of hydrocarbon fractions, there was ultimately obtained a few grams of a pure hydrocarbon which was identified by synthesis as 1 :2-benzpyrene (Cook, Hewett and Hieger, 1933) :—



1 :2-Benzpyrene.

Both synthetic benzpyrene and that of coal tar origin had fluorescence spectra identical with that originally associated with carcinogenic materials, and the results of animal experiments were consistent with the view that 1 :2-benzpyrene is the main carcinogenic constituent of coal tar, although it cannot be said that it is the only such constituent.

With the introduction of the Rosenheim-King sterol formulation in 1932, it became increasingly apparent that there was a real chemical relationship between these synthetic cancer-producing compounds and the naturally occurring sterols and bile acids. It was not without interest that the side chain of the sterol-bile acid molecule seemed to be attached at such a position that cyclisation of this side chain could lead to a hydrogenated 1 :2-benzanthracene ring system. Nor was it difficult to visualise the possibility of such cyclisation in the case of the two most important bile acids, cholic acid and deoxycholic acid, for both of these compounds appeared to contain a hydroxyl group at a suitable position to facilitate this cyclisation to the benzanthracene type of structure. This cyclisation had already been achieved by Wieland (1925) in the preparation of dehydronorcholene by thermal dehydration and decarboxylation of 12-ketocholanic acid which in its turn is readily obtained from deoxycholic acid by oxidation and then reduction. Dehydrogenation of dehydronorcholene under the influence of selenium led to the completely aromatic hydrocarbon methylcholanthrene, the structure of which was proved by synthesis of a degradation product (Cook and Haslewood, 1934).

This methylcholanthrene is a derivative of 1 :2-benzanthracene, substituted in positions 5 and 6, which is a particularly favourable type of molecular structure for carcinogenic activity. Methylcholanthrene has proved to be the most active carcinogenic agent yet encountered. The carcinogenic activity of methylcholanthrene raises the question whether the chemical changes involved in its production from a bile acid may not actually take place in the body under abnormal conditions of metabolism.

An Organic Reagent for Rhenium

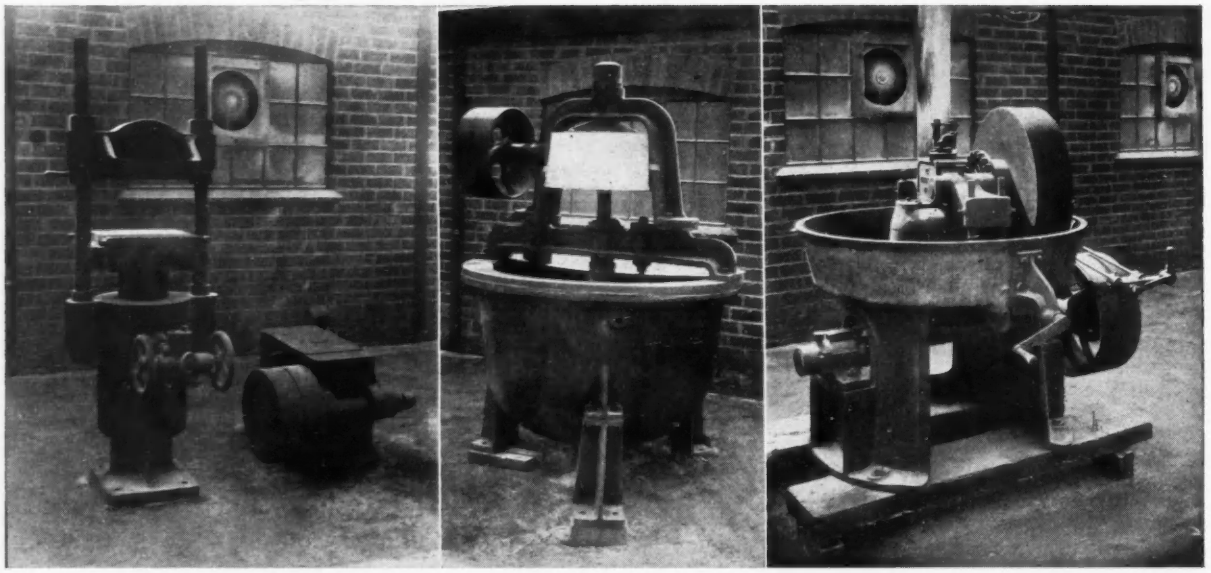
Tetraphenylarsonium

TETRAPHENYLARSONIUM is a new organic radical recently discovered by Blicke and Monroe. It is prepared from triphenyl arsine, which was made in large quantities during the war as an intermediate in the manufacture of poison gas. Soluble salts of this base have been found to form very insoluble compounds with a number of acids which rarely form even moderately insoluble salts; the perchlorate, periodate and perrhenate are of particular interest.

Rhenium is one of the most recently discovered metals and chemists all over the world have been seeking a means of analysing for this element, because, unlike most rare elements, it is being produced in Germany in commercial quantities, and appears to have some industrial uses. Various methods have been proposed for the determination of this metal, none of which were entirely satisfactory. Tetraphenylarsonium perrhenate is a crystalline, extremely insoluble precipitate with a high molecular weight and particularly well suited to the precipitation of this metal and its separation from other elements.

Tetraphenylarsonium chloride forms an extremely insoluble periodite, $(C_6H_5)_4AsClI_2$, which serves as the basis of a very sensitive volumetric method for determining iodine, as well as for the arsonium base itself. The chloride also forms insoluble compounds with chlorides of cadmium, zinc, tin, antimony, mercury, quadrivalent lead, bismuth, platinum and gold. Most of these can be used in quantitative analysis, and possess all the qualities desired in such precipitates. Rapid determinations of zinc, cadmium, mercury, platinum and gold have been made by this method with a high degree of accuracy. According to Professor H. H. Willard, of Michigan, the expense of the reagent is at present a serious disadvantage, but this can be overcome if there is sufficient demand for it.

JAPANESE production of ammonium sulphate during the fertiliser year ended July, 1935, is reported by the Fertiliser Manufacturers' Association as 884,747 metric tons, compared with 753,158 metric tons the previous year. These figures, however, are not strictly comparable owing to changes in membership of the Association during the period. At present the Association includes all important producers, but the Ube Co. did not join until February of this year so that its production prior to this date (estimated at 15,000 tons) is not included.



The old testing press and the original mixer and mill at the Beetle Factory. Although virtually stamped with antiquity they were in regular use only ten years ago.

Growth of the Plastics Industry

Some Contrasts in Old and New Plant

THROUGH the ages Nature has provided man with the primary raw materials needed in his struggle for existence and it has been left to him to select them and apply them to his wants, said Mr. N. Bond, of the Beetle Products Co., Ltd., in presenting "The Beetle Film" at a meeting of the Hull Chemical and Engineering Society on October 29. Looking back fifty years or so, timber, metal and stone were almost exclusively used in the articles that surrounded man in his everyday life. Nature, however, had made provision for his increasing requirements and certain trees were found to yield a sap from which the natural plastic was produced, which in this country was given the name of India rubber as it was thought to have come from India. One of its chief early uses was by school children and students to erase pencil marks, but as its great potentialities became more apparent an industry developed which expanded enormously, especially with the adoption of rubber to the growing demands of vehicular traffic.

The plastic materials which have been so largely developed in recent years, however, owe little to nature as they are a product of the chemist's skill. The raw materials which are the starting point of synthetic resins give in their appearance and properties not the slightest hint that they are capable of being combined and worked to produce the wonderful mouldings, simple or intricate, which we see around us to-day. The chemist alone could not have brought the synthetic resin business to what it is; he needed the co-operation and ingenuity of the engineer to design for him the mould in which not only to fashion his product, but to turn it out on a competitive commercial basis. Moulds require presses actuated by heat and pressure in which to operate them to get the maximum results in the shortest time period, and credit must be given to the engineer for the way he has responded to the chemist's needs and to the demands of the purchaser with whom the price of the finished article is of paramount importance.

In the accompanying illustrations are included the mixer and mill originally used in the Beetle factory in the manufacture of moulding powder. It is virtually stamped with obsolescene—with antiquity—and yet it was regularly turning out tons of moulding powder a matter of only 10 years ago. Modern mixers and mills are also shown and the contrast emphasises the part the engineer has played in the advance of the industry. The moulding press originally used is also shown, and emphasises the wide gulf between it and the highly efficient plant shown in operation turning out mouldings in press units fitted with multi-impression moulds—or from large single moulds of a size which was beyond consideration at the time the old press was in service.

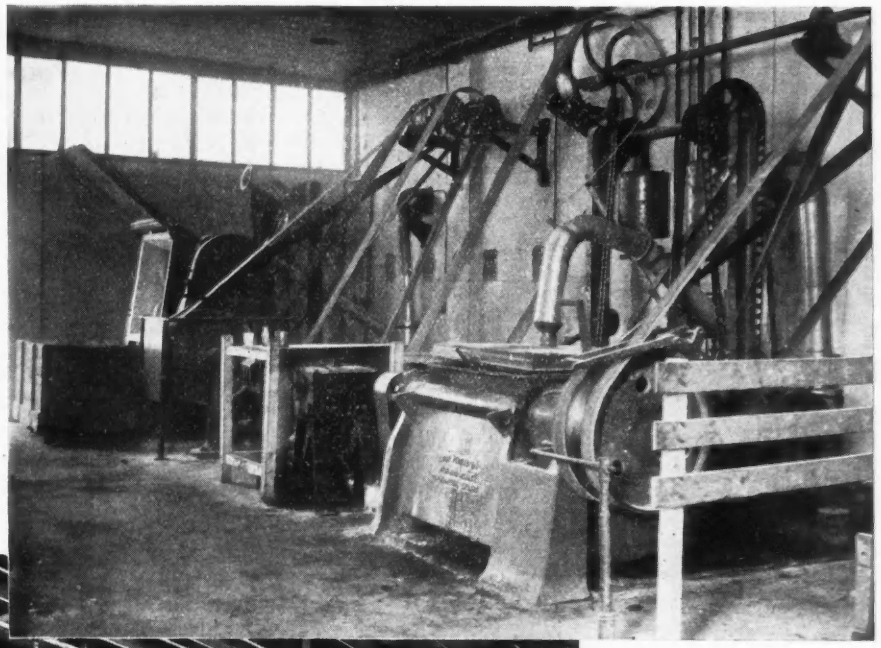
The two classes of synthetic resin compounds most widely employed are the phenolic and the urea types. The phenolic materials are referred to generally as Bakelite, the material taking its name from Dr. Baekland, the scientist whose research led to its discovery. Its commercial development started in the United States. Of the other type, the urea or aminoplastics, Beetle is one. Other trade names of aminoplastics are Pollopas, Scarab and Mouldrite. Beetle derived its name from the trade mark of the company whose chemists invented it, and it is English by discovery, development and manufacture.

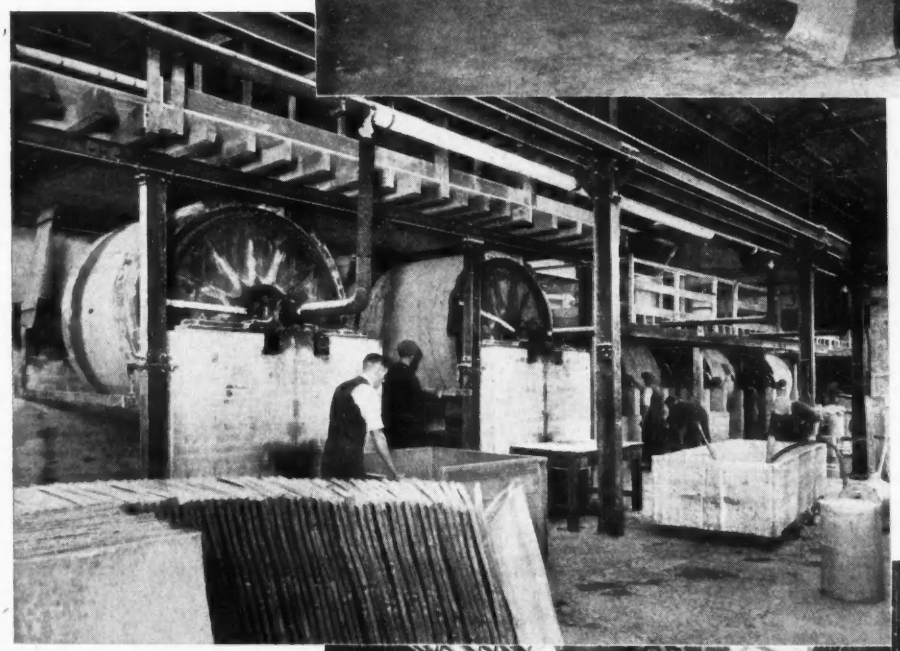
The Bakelite moulding powders produce objects which are opaque and by merit have earned a high place in the industrial world. Beetle, on the other hand, as it is made from a colourless and clear water-white resin and selected cellulose filler, produces mouldings which can be white or translucent and delicate in colour. Beetle originally was more decorative than industrial in its application, but with the advance of moulding technique it is finding its way more and more into commercial application, as is shown by its use in butchers' trays, butter slabs and cosmetic lines.

Being of the Beetle family, Scarab was so named after the beetle which bore that name so proudly in ancient Egypt. The filler used is a less expensive form of cellulose than that employed for Beetle, and permits of only opaque colours being produced. The colours, however, can be bright and light in tone—not subject to discolorations, as the synthetic resin base is colourless and does not, with age, affect the dyes or pigments used in the manufacture of the moulding powders. Scarab was introduced for industrial mouldings where price plays an important part. It is very quick in

cure and it does not stain the moulds.

There is a tendency to regard synthetic resin mouldings as substitutes for other materials, but the producers do all in their power to dispel that idea. Plastics are definitely not substitutes for metals, wood, glass or porcelain. Previously, many lines were made in these other materials, because at the time although they were not the perfect substances to employ they were the best available. Now that materials more nearly perfect are available it is only in accordance with the natural trend of progress to employ them for the jobs for which they





Some of the up-to-date plant in use at the Beetle Factory to-day.

Above are the mixers; on the left are the modern mills and below is a battery of light presses employed in the production of moulded plastic products.

are peculiarly suitable. For example, for non-conducting electrical parts, is there any justification for using metal when plastics can appropriately be employed? They are not substitutes for metal, for they are the materials which would automatically be chosen from the range of material open to selection.

Popular prejudices, or even favours, die hard. The old idea of making electrical or commercial instruments or fittings in sombre effects persisted for a long time long after the original reason for so doing had disappeared. In the days when they had to be made from vulcanite one's choice of colour was limited to

the tones in which vulcanite was available, but when vulcanite was superseded there was no reason other than custom to repeat the old dull colours. A new material should be treated as a new material in its own distinctive way and should get the full benefit of its own identity by not copying in any way that which it has superseded.

A telephone mouthpiece or earpiece was black for a long time, but when white moulding powder became a commercial reality the progressive idea should have been to turn these "personal" accessories out with the cleaner and more hygienic association attached to pure white. Indeed, the whole telephone instrument has no particular claim to merit moulding in a tone appropriate to a funeral. The Postmaster-General wants to get one in every home, and as the intention is therefore for it to be a standard piece of domestic equipment why should it not be made attractive?

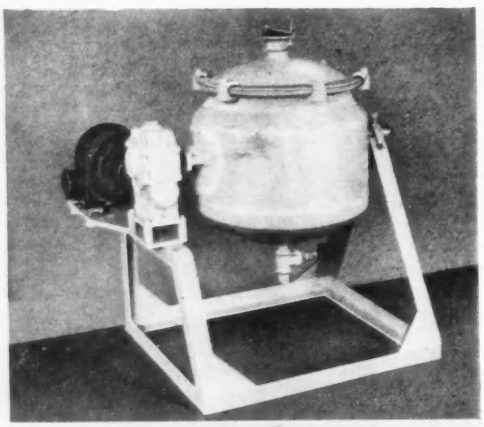
The suitability of mouldings is well illustrated in two fairly recent lines, draining boards for sinks and the slabs on which butter is displayed in grocers' shops. Formerly made in wood, which had to be scrubbed to be kept clean, they are now moulded all in one piece without any seams into which food can penetrate and putrefy.

There is another use in which mouldings have definite superiority over metals, *i.e.*, when they come in contact with salt. There are parts of water softening apparatus which when made in metal corrode badly, as salt is used in revivification. One large firm making water softening apparatus has tried all sorts of metal without success and it has now turned to mouldings in Scarab. The basic materials are urea and formaldehyde. These substances are mixed together and, under the influence of heat, they condense to form a resin which remains in solution. This syrup is then put into mixers to which cellulose pulp is added, together with a small amount of dye of the colour required in the moulding powder. The damp, crumbly mass is then taken from the mixers and put into steam-heated ovens to dry off the moisture, after which it is transferred to porcelain-lined ball mills where it is ground into a very fine state of division. After this it is sieved through silk screens to remove any unground particles. The operatives at this stage wear rubber gloves as every precaution is taken to avoid contamination of the powder. The trolleys into which the material is sieved and the drums into which it is packed are cleaned beforehand with a vacuum cleaner. The men wear respirators, not because the powder is harmful but to satisfy the factory inspector.

British-Made Glass-Lined Equipment

Some Applications of Unusual Merit

BELOW, and on the opposite page, we reproduce some illustrations from a new catalogue (CH-14) of British-made "Pfaudler" glass lined equipment as used in the chemical industry. This catalogue, issued by Enamelled Metal Products Corporation (1933), Ltd., has been made as comprehensive as possible by giving specifications, tables of capacities, dimensions, etc., for practically every type of unit. For requirements of the chemical industry which cannot be met by strictly standard equipment, the makers of "Pfaudler" equipment are prepared to co-operate with potential purchasers and design equipment suitable for their individual needs.

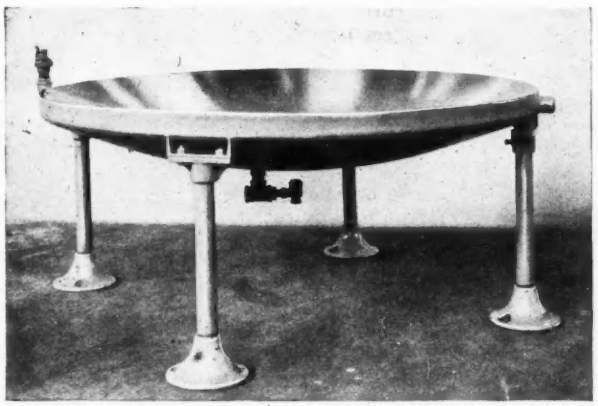


Top: **Glass Lined Tumbling Mixer.**
Bottom: **Glass Lined Shaker Mixer.**

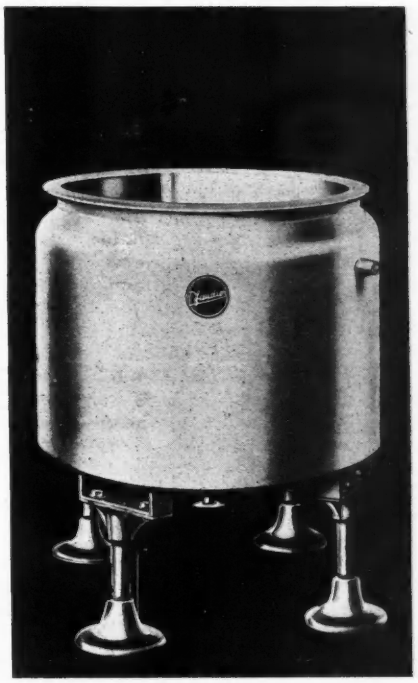
Pfaudler glass lined tumbling mixers, as illustrated, provide end-over-end agitation and find application during the initial stages of extraction, for dissolving purposes, for mixing light medicines and for highly volatile substances. This type of agitation assures complete solution of soluble semi-solids or solids. In some cases, vacuum is applied prior to the time the mixer is started to avoid oxidation of the product. For products sensitive to metals, this tumbling mixer is the answer. Single-shell or steam-jacketed constructors are available, depending on requirements, and such mixers are sturdily built for various mixing speeds. Glass-lined shaker-mixers, also illustrated, are effective where violent agitation is required. Here agitation is produced by an eccentric drive which causes a rocking motion through an angle of 60°. The container is built in one piece, all-welded construction, with clamped manhole, having a product inlet and outlet. The mixer is driven by fast and loose pulleys, and is mounted in a sturdy tubular frame support.

GERMANY has the largest share of Chile's pharmaceutical and essential oil import trade, but recently France has been increasing sales by quoting prices below those of Germany on many articles. In some products the United States predominates. Owing to Government inspection, the standards of pharmaceutical products used in Chile are considerably higher than those prevailing in some other South African countries. Because of competition, the question of prices is a determining factor in effecting sales. During the first three months of 1935, the value of imports of chemical products into Chile was approximately £50,000. Imports of drugs, pharmaceutical products and cosmetics in the same period had a value of about £27,120. The value of imports of essences and essential oils for industrial uses was £5,880.

British-Made Glass Lined Equipment

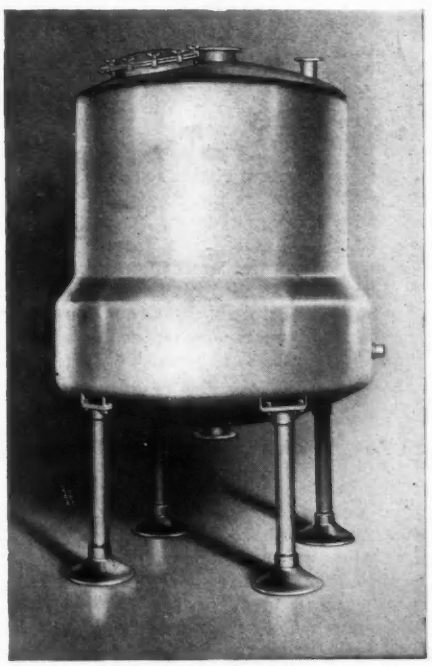


Glass Lined Steam Jacketed Drying Tables are used by manufacturers of effervescent salts and other crystals which are susceptible to discoloration by metals. Such tables commonly measure 72 inches in diameter with a maximum depth of 7 inches.

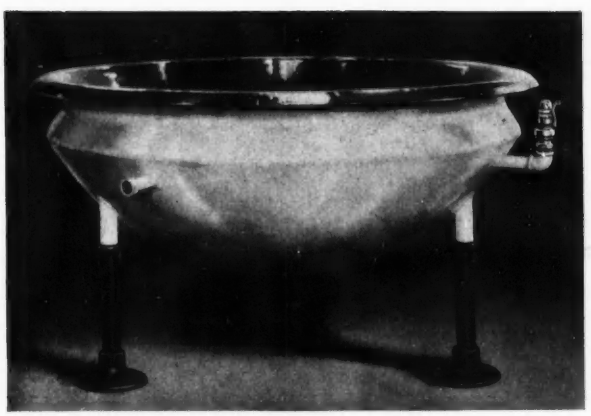


Glass Lined Jacketed Open Mixing or Storage Tanks may be used for evaporating, sulphonating, heating and cooling operations. Steam or oil, circulated in the jacket, assures a variety of high temperatures.

This type of Glass Lined Pan is excellent for crystallisation purposes. The chance of adherence of products, or of contamination, are reduced to a minimum because of the glass lining. Should the application of heat be required the tank can be furnished jacketed, with all-welded construction.



There is an increasing use of Glass Lined Vacuum Pans for the processing of extracts such as insulin and liver hormones. Here the glass enamel lining produces higher yields and purer products by removing the adverse catalytic effect that may be caused by metal in contact with organic substances.



Glass Lined Equipment is particularly desirable for the evaporation, concentration and crystallisation of laboratory reagents and pharmaceutical products, and in the preparation of the salts of rare metals. It is possible to partially make such products in these pans, and then, if necessary, evaporate the resulting solutions. The large heating area of the pan illustrated facilitates rapid evaporation and economical operation.

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Economics of the Synthetic Manufacture of Ammonia—VII

Notes on General Lay-Out and Estimated Working Costs

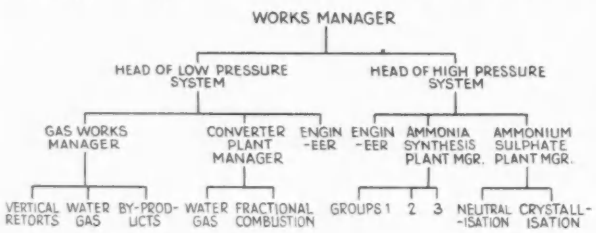
These notes were originally compiled in 1918, with the object of providing information necessary to decide whether it would be advantageous to manufacture ammonia synthetically as a commercial proposition in England. They are now published in the hope that they will prove useful to young chemical engineers, in showing the details involved in the preparation of such a scheme.

THE design of ammonia synthesis plant on the lines already worked out lends itself to a simple lay-out, consisting essentially of a building for low pressure gas work and one for high pressure work.

The building for the low pressure gas work would consist of three bays. The first bay would contain the vertical retorts in one row; the second would contain the water gas and producer plant; and the third, the converters for the water gas catalysis and fractional combustion.

The building for the high pressure plant would be situated not far distant, so as to economise in regard to the length of steam pipes; low pressure steam pipes would be of large diameter and therefore costly. It would be arranged to house the machinery, *viz.*, the compressors and the engines for driving the steam. One section of this building would contain the scrubbers and water pumps for washing out the CO_2. The bombs would be arranged in bays along one side of the building; each bay would contain five bombs, and the drying cylinders and absorption scrubbers. The pumps would be situated in a room together with the whole of the control valves, etc.

A scheme of this sort lends itself to a simple organisation consisting of works manager and under him would be a head of low pressure system and a head of high pressure system:—



The main feature of this scheme is the economic utilisation of the only essential raw material required, *viz.*, coal. Coal, air and water are the raw materials from which ammonia can be manufactured. Nitrogen and hydrogen are first obtained, then these are compressed and caused to combine to form ammonia. 1½ tons of coal will give about one ton of ammonium sulphate and at the same time all the valuable by-products from the coal (tar, benzol, toluol, naphthalene, ammonia, cyanides, sulphur, etc.) are obtained.

Scheme of Manufacture

The process is particularly suited to the English conditions, as very little power would be required (only about 20 h.p. per ton of ammonium sulphate per day), and the utilisation of the coal is effected to the best advantage. Nearly an equal weight of product is obtained ready for export, worth about 15 times the value of the coal.

The industry would supply a cheap source of ammonium sulphate for fertilisers, of ammonium carbonate and bicarbonate, of urea, of cyanides, of liquid ammonia for refrigeration and of nitric acid. In connection with electric power schemes it could be associated with the production of carbide from which acetylene, acetic acid, alcohol, cyanamide, etc., can be produced, but for the bulk production of fertiliser where power is raised from coal the ammonia synthesis process should be used. The carbide manufacture should act only as a means of utilising off-peak loads. It would be most wasteful of the nation's asset to make fertiliser by he cyanamide process. Nitric acid has only a small and limited market. At the outset, therefore, it would be a mistake to establish the industry with reference to this product. At the same time, however, nitric acid could be produced by subsequent oxidation of the ammonia cheaper than from Chile nitrate.

Estimated Costs

Raw Materials.

About 1.34 tons of coal are required per ton of ammonium sulphate. Taking the average cost of coal at 20s. per ton and allowing for the value of the by-products obtained the cost of raw materias will be

$$1.34 \times 20 - 1.3 \times 5 = 20\text{s.}$$

To this must be added the cost of the sulphuric acid.

1.07 tons of 75 per cent. chamber acid are required per ton of ammonium sulphate. The cost of 75 per cent. chamber acid is now as high as £5 per ton, though prior to the war it was £1 per ton. It is difficult, therefore, to estimate what will be the probable cost, but it will, of course, have its proportional effect on the price of ammonium sulphate, which is now at £17 per ton instead of £13 per ton. Suppose the figure of about £2 10s. is taken, then the cost of acid would be about 53s. 6d.

The cost of other raw materials such as lime, etc., would be very small in proportion.

Labour, Repairs, etc.

The labour in relation to the whole output should be very small. Apart from the coal and the ammonium sulphate there are practically no solid products to handle. The control of the flow of gases requires trained men, but not a large number of hands. Therefore labour costs ought to be low.

The maintenance of the high pressure system may be rather heavy and provision for standby plant must be arranged for the whole of the high pressure section.

The maintenance of the vertical retort system is considerably less than of a coke oven plant, and the maintenance on the rest of the system ought not to be high.

Power Requirements.

The power required corresponds to 338 K.W.H. per ton of sulphate, which at 0.25d. per unit = 7s. per ton.

Capital and Process Costs.

The capital cost of the compressor and ammonia synthesis plant has been assumed to be £1,000,000 for 340 tons of ammonium sulphate per day. On the same basis for 100 tons per day it would be about £300,000. A rough computation for this part of the plant indicates a capital expenditure of £200,000 to £300,000 for that portion of the plant following the fractional combustion.

It has been assumed that the cost of production of the gases would not amount to more than 3s. per 1,000 cu. ft. It remains, therefore, to estimate the cost of production of these gases on the above scheme.

In the carbonisation of one ton of coal the following are given as war costs at a large gasworks (1918):—

	pence
Purifying	1.25
Repairs and maintenance	95.4
Labour	45.4
Management	4.47
Miscellaneous	12.36
Capital charges	44.70
Total	203.57 = 16s. 10d.

From this can be deducted the value of the by-products:—

Tar	21.2
Sulphate of ammonia	33.4
Miscellaneous	6.1
Total	60.7 = 5s. (about)

Hence the cost of production of gas from one ton of coal is

$$\frac{203.58 - 60.7}{12} = 11\text{s. } 10\text{d.}$$

As there are 1.1 tons of coal used for the production of gas, 1.1 × 20 = 22s. minus 5s. (the value of the by-products), or 17s. is the cost of the coal.

The cost of the producer gas may be taken at .7d. per 1,000 cu. ft. Therefore, for

$$\frac{7{,}750{,}000}{1{,}000 \times 100 \text{ cu. ft.}}$$ the cost would be 11½d.

The coke and the retort gas are utilised in other parts of the plant for steam raising, water gas production and compressing. Therefore these items do not appear.

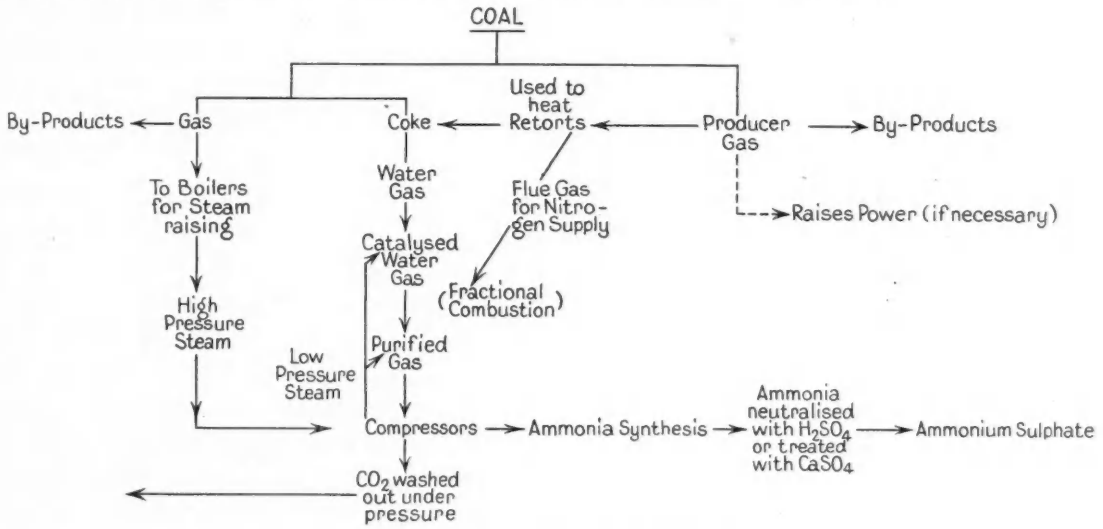
Water gas may be made at a cost exclusive of coke of 4d. per 1,000 cu ft. Therefore, as 3,700,000 cu. ft. are made per day, the cost per ton of coal would be

$$\frac{3{,}700{,}000}{100 \times 1{,}000 \times 4\text{d.}} = 12\text{s. } 6\text{d.}$$

As the cost of catalysing the water gas will include practically no cost for material, there are only the necessary charges for interest, depreciation, labour and repairs, and as the plant is not a costly one these should certainly not be greater than 10s. per ton of ammonium sulphate, so that we have

	s.	d.
Cost of coal	17	0
Gas production	16	10
Cost of water gas production ...	12	6
Catalysis	10	0
Producer gas		11½
Total	57	3½

To this has to be added the cost of removal of the CO_2, but, as the capital cost of the plant has already been included in the £300,000 estimated, and the power is raised from the gas which is fed over from above, the cost of this portion of the process cannot be very high.



Flow Sheet of Scheme of Manufacture.

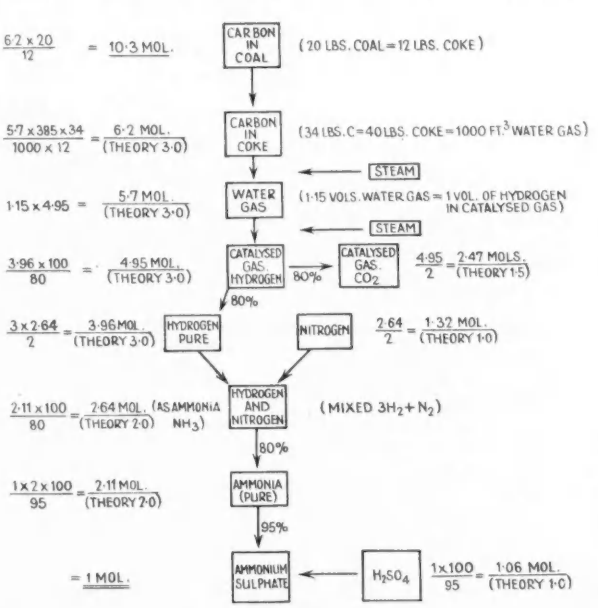


Table of Quantities.

The estimate which allowed 84s. per ton of ammonium sulphate therefore appears to be a liberal one.

Suppose capital costs of above plant for gases amount to £200,000, then taking

	s.	d.
Interest at 5 %	6	8
Depreciation at 10%	13	4
Repairs at 10 %	13	4
Labour at 1 %	1	3
General charges at 5 %	6	8
	£2	1 4
Adding cost of coal 1.3 tons	1	0 0
Total	£3	1 4

Thus we have two estimates for cost of production of hydrogen and nitrogen which are round about £3, *i.e.*, about 2s. 4d. per 1,000 cu. ft. of hydrogen.

The total costs of production for the purpose of this estimate may be therefore taken to be :—

Hydrogen and nitrogen	£3	0	0
Power		7	0
Interest, capital, etc. on synthesis plant	2	12	0
Sulphuric acid	2	10	0
	£8	9	0

Thus for the capital cost of £500,000 to £600,000 for the whole plant it should be possible to produce ammonium sulphate at the estimate of about £9 per ton, while the estimates made are so conservative that there is every reason to expect a lower figure than this.

If the selling price of ammonium sulphate is about £14 per ton, this would leave a profit of about £5 per ton or £150,000 per annum (*i.e.*, 25 per cent. of the capital expenditure).

The first small unit would be weighted with a greater relative capital expenditure and if it only paid its own way it would justify the expenditure, as experience would be gained for the erection of the whole plant. On the other hand, it must be remembered that as the process has already to bear a fairly large proportion of cost due to capital, *viz.*, about £2 10s. a ton, or nearly 30 per cent. of the total cost, it is important to ensure that the process is not over-burdened with unnecessary capital expenditure due to inconvenient site or other causes.

It would seem advisable to commence with a capital of about £300,000 and to erect a unit to produce at the rate of 7,500 tons of ammonium sulphate per annum, subsequently enlarging this by further expenditure of capital up to about £600,000 for the production of 30,000 tons ammonium sulphate per annum.

I.C.I. Capital Reduction Petition

Opposition by Deferred Shareholders

IN the Chancery Division, on November 8, Mr. Justice Eve continued the hearing of the petition of Imperial Chemical Industries, Ltd., for the confirmation by the Court of a reduction of capital from £95,000,000 to £89,565,859, which is being opposed by a committee representing more than 13,000 deferred shareholders.

Sir William Jowitt, K.C., for the opposing shareholders, addressed the Court, and said it must be borne in mind that no part of the capital of Imperial Chemical Industries had been lost. There was no suggestion that the £5,500,000, by which it was proposed to reduce the capital, was not represented by available assets. In the second place it was manifest that the reduction of capital which was suggested was to be made wholly at the expense of one class of shareholders—the deferred shareholders. The other class of shares were left intact. The considerations that must apply to the matter before the Court were, that, (1) the legal requirements as to the meetings of the shareholders had been complied with: (2) the vote on which the scheme was carried must be obtained after a complete disclosure of all the relevant facts, and (3) the Court must be satisfied that the scheme was fair and equitable.

Directors' Share Holdings

A reduction of capital, argued Sir William, ought not to be confirmed in a doubtful case. He contended that the deferred shareholders should have been given an opportunity of considering the scheme free from the influence of the oratory of ordinary shareholders at the meeting of the ordinary shareholders at which the deferred shareholders were perforce present. The circular which was addressed to the shareholders did not contain that fair and complete exposition of all the relevant facts which the shareholders were entitled to expect to assist them in the consideration of the scheme.

Counsel in no shape or form questioned the good faith of the directors of I.C.I., but those directors had a large and preponderating interest in the ordinary shares in the company as compared with the interest in deferred shares. If it had been known that the directors held at the date of the meetings, ordinary shares of the market value of £688,000 and deferred shares of the market value of £5,000, a number of shareholders might not have left themselves so blindly in the hands of the directors, who, so far as they knew at the time, were wholly disinterested. In the circumstances it was most unfortunate that it was stated at the extraordinary general meeting that the directors had given the scheme impartial consideration. It was wholly untrue to say, as was stated in the circular, that the scheme would result in the company's financial position being strengthened. The word "earnings" occurred incidentally twice in the circular, while stress and emphasis was laid on past dividends. Yet, where one had got earnings, dividends were of absolutely secondary importance in calculating the position of a company. Certain sums had been put to the reserve which might properly have been distributed as dividends.

Counsel, proceeding, developed his submission that the necessary requirements with regard to the meetings of the shareholders, called to consider the scheme, had not been complied with in that proper separate meetings of the shareholders affected—ordinary and deferred—were not held.

With regard to the rates of exchange of the shares—four deferred for one ordinary—that was purely arbitrary, and it was recommended by the board as being that which they unanimously recommended, after careful consideration of all the relevant facts. In those circumstances, without in any way questioning the good faith of the directors, the board should have informed the shareholders that they had a very large holding of ordinary, and a very small holding of deferred shares. That information was not given, and the Court ought not to allow that sort of principle to go unchallenged. He further contended that the vote by which the scheme was carried was not obtained after a full and complete disclosure of all the relevant facts, and that therefore the shareholders had to make up their minds in the dark. There were 13,000 shareholders, holding 4,400,000 shares opposing the scheme, which scheme, he argued, would not have any appreciable effect in strengthening the financial structure of the company.

Mr. Wallington, K.C., supported the arguments of his learned leader.

On Wednesday his lordship approved of the company's scheme and said he would give his reasons at a later date.

Proposed Fuel Luncheon Club

Sir John Cadman as President

STEPS have been taken to form a Fuel Luncheon Club at which short addresses will be given on technical and economic matters concerned with fuel and fuel appliances, the membership being restricted to technical men who are members of societies largely engaged in the study of fuel problems, each such society being represented on the council of the club. The Coke Oven Managers' Association, the Electrical Power Engineers' Association, the Institute of Fuel, the Institution of Gas Engineers, the Institution of Mining Engineers, the Institution of Petroleum Technologists and the Low Temperature Coal Distillers' Association, have appointed delegates.

An inaugural luncheon will be held at the Connaught Rooms, Great Queen Street, London, on November 27, at 12.45 for 1.15 p.m., at which Sir John Cadman, the first president, will briefly explain the aims and rules of the club, give an address, and invite membership. Members of each of the societies represented on the Council are welcome to attend this inaugural lunch, the charge for which will be 4s. (wines, etc., extra).

The first meeting of the club proper will be held at the Connaught Rooms in January, and it is hoped to arrange luncheons monthly, with the exception of June, July and August each year. The subscription will be 10s. per annum. Mr. R. T. Rees is the secretary.

Notes and Reports from the Societies

Society of Chemical Industry

Bristol Section : Viscosity of Tar

ALTHOUGH curves (ηT^n = a) obtained by plotting viscosity against temperature give a direct picture of the behaviour of tars they have certain disadvantages when comparison of tars is to be made, said Dr. J. G. Mitchell and Dr. A. R. Lee, in a joint paper read before the Bristol Section of the Society of Chemical Industry on November 7. The method of Pickard, in which log viscosity is plotted against log temperature (Fahr.), results in a straight line. The slope of this line is a constant corresponding with n in the formula ηT^n = a. This constant has been termed the logarithmic temperature coefficient and may be regarded as a measure of susceptibility. The true susceptibility of tar ($d\eta/dT$) varies with temperature and cannot be stated as a constant.

When the logarithmic temperature coefficients of road tars were plotted against log viscosity at 25° C. the experimental values fell within a narrow area bounded by two parallel lines indicating that the logarithmic temperature coefficient is approximately proportional to log viscosity. A complete statement of changes of viscosity over a considerable range of temperature is given by (a) viscosity at a specified temperature and (b) the log temperature coefficient. In some low aromatic tars, instead of one straight line two lines meeting at a slight inclination were found. The straight line relationship also breaks down at low temperatures.

The variation of viscosity with oil content was examined by distilling tars *in vacuo*. The relationship between the logarithmic temperature coefficient and log viscosity was a straight line. On plotting log viscosity against percentage loss an approximately linear relation was found and this can be applied to the examination of exposed samples. If a pitch is oiled back the logarithmic temperature coefficients of the resulting tars depend on the kind of oil used, although for any one oil the straight line relationship is maintained. On plotting the percentage of added oil against log viscosity a curve is obtained which over the range of viscosities used in road practice may be regarded as linear. This relationship provides a convenient method of determining the proportions of pitch and oil required to form tars of specified viscosities.

Yorkshire Section : Analytical Papers

A JOINT meeting of the Yorkshire Section of the Society of Chemical Industry and the Hull Chemical and Engineering Society will be held on Tuesday, November 19, in the Municipal Technical College, Park Street, Hull, at 7.0 p.m., when a paper on "A new Kjeldahl method for the determination of nitrogen in Foods, Feeding Stuffs, Leather, etc.," will be read by Mr. A. E. Beet, B.Met., and Mr. D. G. Furzey, B.Sc. (Tech.). The improved Kjeldahl method described for coal ("Fuel," 1934, *13*, 343) has been modified and successfully applied to a variety of materials. The use of selenium-mercury as catalyst shortens the time of digestion to one-third of that needed when copper sulphate and sodium sulphate is used, and halves the total time of the determination. The ammonia is absorbed in boric acid solution which permits a direct titration. A mixed indicator (methyl red and methylene blue) gives a sharper end point than methyl red alone.

At the same meeting a paper on "A vacuum percussion disintegrator and its use for the separation of plant remains from coal" will be read by Mr. J. C. McCrae, B.Sc., A.I.C., and Mr. A. M. Wandless, M.A. The percussion disintegrator to be described is one with which the megaspores were released from a coal without excessive pulverisation.

The date of the meeting in Sheffield has been altered to Tuesday, April 7, when it will be held in co-operation with the Sheffield Metallurgical Association at their premises, 69 West Street, Sheffield.

Society of Public Analysts

Election of New Members

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, London, on November 6, the president, Mr. John Evans, M.Sc., F.I.C., being in the chair.

Certificates were read in favour of K. F. Allen, B.Sc., V. A. Cachia, B.Sc., A.I.C., A. R. Campbell, F.I.C., P. Farrugia, B.Sc., M.D., G. E. Forstner, M.Sc., A.I.C., H. R. Knight, A.I.C., A.R.S.M., W. G. Mitchell, T. L. Parkinson, B.Sc., A.I.C., H. S. Redgrove, B.Sc., F.I.C., H. N. Wilson, F.I.C., and W. Wilson, F.I.C.

The following were elected members of the Society : W. R. Bage, A. R. Bonham, B.A.Sc., F.C.I.C., H. C. P. Chapleau, B.A.Sc., L. Cooksey, B.Sc., F.I.C., D. E. Davis, B.Sc., F.I.C., F. Ellington, B.Sc., A.R.C.S., A.I.C., E. O. Heinrich, B.S., J. A. D. Hickson, B.Sc., A.I.C., D. R. Jackson, D. C. Macpherson, B.Sc., Florence E. Murphy, B.Sc., T. C. J. Ovenston, B.Sc., Ph.D., A.I.C., G. H. Stott, M.Sc., F.I.C., B. C. L. Summers, B.Sc., and S. G. Willimott, B.Sc., Ph.D., A.I.C.

Halibut Liver Oil

The characteristics of halibut liver oil were described in a paper by Mr. R. T. M. Haines and Dr. J. C. Drummond, D.Sc., F.I.C. Over a wide range of oils the relationship between the iodine value and the amount of vitamin A present has been found to be linear. Parallel with the rise in iodine value in these oils there is a steady increase in the refractive index and the proportion of unsaponifiable matter. Moreover, in the unsaponifiable fraction the proportion of sterols precipitated by digitonin tends to fall as the proportion of vitamin in the oil increases. The values cited show that there is an inverse relationship between the amounts of sterols and of vitamin.

Lactic Acid in Blood

Notes on Mendel and Goldschieder's method for determining lactic acid in blood were given in a paper by Mr. R. Milton, B.Sc. The factors affecting the reaction upon which the colorimetric method of Mendel and Goldschieder (red colour with veratrol in presence of sulphuric acid) is based have been studied and the optimum conditions determined. The application of the method to the determination of lactic acid in blood has been considered, and a technique devised which gives more consistent results than the volumetric method. The method is also applicable to other biological fluids, such as milk and urine.

Microchemical Analysis

The application of controlled potential to microchemical analysis was the subject of a paper by Mr. A. J. Lindsey, M.Sc., F.I.C., and Dr. H. J. S. Sand, D.Sc., Ph.D., F.I.C., who said a modification of Pregl's apparatus has been devised in which depolarisers (sulphates and hydrochlorides of hydrazine and hydroxyalmine) are used. These make the boiling temperature unnecessary, stirring being effected by means of bubbles of an indifferent gas instead of steam bubbles. The micro method described may be used for copper depositions and other determinations to which the Pregl method is applicable.

Dealing with the micro-electrolytic determination of bismuth and lead and their separation by graded potential, Mr. A. J. Lindsey, M.Sc., F.I.C., said a micro method of depositing bismuth and separating it from lead has been devised, the modification of Pregl's apparatus being used for the purpose. After quantitative deposition of bismuth by the technique described, lead is deposited from the filtrate in the form of lead dioxide. The method is also applicable to the separation of copper from tin in chloride solutions.

Personal Notes

MR. P. J. HALER, principal of Leyton Technical College, has been appointed principal of the new South East Essex Technical College, which is now being erected at Barking.

MR. G. S. HAMILTON, head of the firm of James Hamilton and Son, manufacturing chemists, Constable Street, Dundee, who died last week, was buried on November 8.

MR. J. BRASS has been awarded the medal of the Institution of Mining Engineering in recognition of distinguished service to the mining profession and industry over a period of many years.

MR. D. MCMURDO, of Ladybank, has been presented with a silver cigarette case as a parting gift from his fellow employees of Briggs' Chemical Works, Ladybank. Mr. W. H. Black, manager, made the presentation.

MR. R. H. HENRIKSEN, A.I.C., M.P.S., has been appointed pharmacist to the London County Council Mental Hospital, West Park, Epsom. He will take over his duties on December 2.

DR. C. H. DESCH delivered his Jubilee Lecture to the Birmingham and Midland Section of the Society of Chemical Industry, at the University on November 8. His subject was "Metals in the Chemical Industry."

MR. D. KERR, on retiring after 33 years' service in the Imperial Chemical Industries factory at Ardeer, has been presented by his colleagues with a timepiece and smoker's outfit, Mrs. Kerr receiving a handbag.

MR. C. H. MITCHELL, through whose death on October 29, the leather trade has suffered a severe loss, was secretary of the Master Tanners' Association, and the North-Western Tanners' Federation. He was also secretary of the Leather Trades and General Insurance Co.

DR. G. W. BRINDLEY, assistant lecturer in physics in the University of Leeds, has been awarded the Mackinnon research studentship of the Royal Society for his research on X-ray reflections from metals in relation to atomic vitiations.

DR. F. E. ROWETT, principal of the North-Western Polytechnic, has died at the early age of forty-six years. After spending one year at East London College under Professor D. A. Low, he obtained a Whitworth scholarship, the first year of which he spent at the Royal College of Science under Professor Perry, and he remained two years at St. John's College, Cambridge, where he took his degree in 1914 on the research side, working under Professor Hopkinson. In 1918 he was appointed principal of the Medway Technical Institute, Gillingham. He took his B.Sc. at London in 1919 with first-class honours, and his D.Sc. in 1921 for a thesis on "Accurate Viscosity Determination of Fluids."

MR. REGINALD S. HAWARD, who died on November 7 at the age of 41, was educated at Aldenham School, and at the time of his death was engaged on special statistics and records in charge of a department recently set up by Imperial Chemical Industries, Ltd., at Millbank. Previously in charge of chemical sales in the London area he was under Mr. B. B. Houston, with whom he had served for many years and for whom he had a great regard and affection. Immediately prior to the merger which brought Imperial Chemical Industries into being, Mr. Haward was in control of Brunner Mond's sales office in London. He joined the firm in 1919. The end of the war found him an instructor in aerial gunnery at Leuchars. He learned to fly at Montrose and there met Miss Duncan, who became his wife. In 1917 he was injured in an aeroplane crash which prevented him flying again, and which it is thought may have been the cause of the malady which eventually caused his death. His interests were largely domestic. He leaves a wife and two children.

MR. H. R. HUDSON, of Owen and Hanbury's (Africa), Ltd., has been elected president of the newly-constituted Natal Pharmaceutical Society.

MR. E. G. GOLDSCHMIDT, founder and senior director of Brandeis, Goldschmidt and Co., metal merchants, left £164,362, with net personalty £159,612.

MAJOR PECK, president of the Pharmaceutical Society, read Professor Arthur Smithells's Harrison Memorial Lecture to the Society on November 12, owing to the absence of the author, who was in bed with laryngitis.

MR. W. L. T. ARKWRIGHT, J.P., chairman and managing director of the Tungsten Manufacturing Co. and of Tangwire Ltd., died on November 8 after a brief illness. The funeral took place on November 12 at Great Missenden, Bucks.

DR. H. H. EVERS, B.Sc., F.I.C., of the British American Tobacco Co., Ltd., will speak on "The Scientific Aspect of Tobacco Manufacture," at a joint meeting of the Liverpool and North-Western Section of the Institute of Chemistry with the Liverpool Section of the Society of Chemical Industry in the Large Hall, the City Technical College, Byrom Street, Liverpool, on Thursday, November 21, at 6 p.m.

MR. KENNETH GORDON, who is in charge of the Billingham hydrogenation plant of Imperial Chemical Industries, Ltd., will read a paper on "The Development of Coal Hydrogenation by I.C.I.," at a meeting of the Institute of Fuel on November 22, at the Institution of Electrical Engineers, London. Sir John Cadman will take the chair.

DR. ERIC K. RIDEAL, F.R.S., Professor of Colloid Science at Cambridge University, followed by Dr. J. K. Roberts and Dr. R. M. Barrer, will open a discussion on "Some Aspects of the Interaction between Gases and Solids" at the ordinary scientific meeting of the Chemical Society, to be held at Burlington House, Piccadilly, on Thursday, November 21, at 8 p.m. Professor A. J. Allmand, Dr. R. C. L. Bosworth, Dr. A. Farkas, Professor W. E. Garner, Professor J. E. Lennard-Jones and Dr. H. W. Melville hope to take part in the discussion.

Imperial Smelting Corporation

Further Expansion in Zinc Production

IN its annual report for the past twelve months, the Imperial Smelting Corporation states that the National Smelting Co. and its subsidiaries are now equipped with plant having a production capacity of 70,000 to 80,000 tons of sulphuric acid per annum. Imperial Magnesium Corporation has been formed to combine the interests of British Aluminium Co., Imperial Chemical Industries, Magnesium Metal and Alloys, and the National Smelting Co., in the production of magnesium, and is now producing at Rainham.

In the last report reference was made to an arrangement entered into with Fison, Packard and Prentice, Ltd., for the merging of interests in the fertiliser business in the West of England. National Fertilisers, Ltd., has been formed for this purpose, and is now erecting a superphosphate and compound fertiliser plant having a preliminary capacity of 70-80,000 tons per annum.

The production and sales of zinc alloys has shown further expansion, and the sulphate of alumina plant at Avonmouth is now being extended, while the results obtained from the production of zinc sulphide pigments at Widnes have been satisfactory. Further additions are being made to the plant at Widnes to increase its efficiency and to widen the range of its products.

Letters to the Editor

The Editor welcomes expressions of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

Aluminium in Food

SIR,—In an editorial note in THE CHEMICAL AGE of November 2 it is stated that only minute quantities of aluminium get into food from cooking vessels. I suggest you should also comment that where Zeolite softeners are used with a water of considerable temporary hardness, sodium carbonate is a constituent of the water. This will react with aluminium cooking vessels, dissolving comparatively large amounts of aluminium which will contaminate the food. This is a matter of fact whether or not the aluminium has any physiological action. The use of these softeners for household purposes is increasing rapidly, and the possibility of the reaction mentioned is usually overlooked.—Yours faithfully,

W.H.

Patents in Great Britain

SIR,—The present position as pointed out by Dr. Dreyfus and amplified in your leader is undoubtedly most unsatisfactory from the point of view of the inventor with limited means. Those who have had to consider the practical side of these conditions will at once agree that inventors in this country have to meet difficulties and expense which those in certain other countries escape.

In Germany, a patent is published after a preliminary and exacting examination into validity by the Patent Office, and points raised in opposition are fought out before the Patent Office who, it is understood, calls in outside expert help if necessary. The opposer states his objections to the granting of the patent in writing, and in due course the inventor replies to these, also in writing, and then the Patent Office gives its decision. This decision may be appealed against and the programme is repeated. In exceptional cases a further appeal may be entered on points of detail. The cost of all this to the inventor is *not more than* £70 in all, and he does not have to pay the opposite side expenses if he loses.

Here a determined case may go to the House of Lords and the cost may be something between £10,000 and £100,000, and if the inventor loses he has to pay the costs of both sides. The professional witness and counsel who explains everything to the judge as if the latter had never heard anything about the subject are eliminated in the German procedure because in effect when opposition is over and unsuccessful and the patent sealed the inventor may reasonably expect that his troubles are over. Not so here, they may be just beginning. After a period of six years the inventor there has the knowledge that no further opposition is possible in the courts and he finds himself in complete possession of his patent, provided he pays renewal fees in due course.

In Canada and the United States the first fees are the only ones asked for by the Patent Office, and the patent runs its course without hindrance from any call for further Patent Office fees. If these points were settled as Germany and Canada have settled them respectively, inventors in this country would have some return for their time and experience and their inventive powers.—Yours faithfully,

W. P. DREAPER.

Hampstead, N.W.3.

Continental Chemical Notes

Russia

EXTENSIVE COPAL DEPOSITS are reported to have been located in the Baku region.

Poland

THE BORUTA CHEMICAL CONCERN, of Zgierz, is reported to be increasing its output of para-nitraniline to an extent sufficient to cover domestic requirements.

France

A SUMMARY OF THE SUGGESTED USES for aluminium chloride as revealed in the recent patent literature appears in the "Revue des Produits Chimiques," October 15. Cracked hydrocarbon distillates are converted into viscous oils by treating at temperatures above 100° C. with aluminium chloride (French Pat. 608,425). On heating rubber with aluminium chloride under certain conditions, thermoplastic materials are said to be formed (French Pat. 615,195). For decolorising acetone oils and methyl acetone the use of the anhydrous salt has been patented (French Pat. 619,857). Several applications of the catalytic action of aluminium chloride have also been disclosed, including production of synthetic resins from polyvinyl alcohol and its esters (French Pat. 656,151); condensation of propylene with carbazole to yield resins (French Pat. 666,718); production of viscous oils from mineral oils and olefines such as ethylene, propylene and butylene (French Pat. 650,799); conversion of ethylene into hydrocarbons boiling between 120 and 200° C. by reaction under pressure with methyl chloride in presence of aluminium chloride (French Pat. 695,125); production of rubber—or ebonite-like products by condensing polyvinyl esters with unsaturated aldehydes (French Pat. 696,008). Salts of aluminium, and aluminium chloride in particular are asserted to possess anti-cryptogamic properties (French Pat. 620,941). To improve the water vapour-absorbent properties of active carbon it has been proposed to incorporate aluminium chloride or other hygroscopic salt (French Pat. 700,511). In the galvanising industry it has been found that an effective fluxing agent is a mixture of zinc chloride and ammonium chloride, together with aluminium chloride (French Pat. 701,259).

Belgium

THE 1934 TO 1935 TRADING REPORT of the Union Chemique Belge discloses an improvement in the finances of the company as well as a reduction in working expenses. Devaluation of the belga has favourably influenced the company's trading. Extensions have been made in the pharmaceutical and photographic chemical sections.

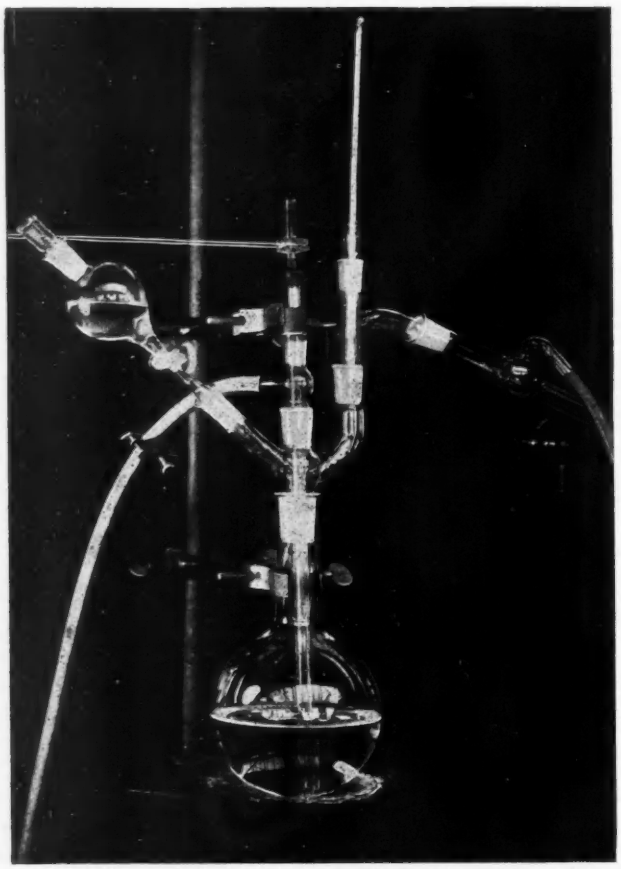
Czechoslovakia

A PERMIT HAS BEEN GRANTED to the Alcohol Development Co. for production during 1935-36 of 18,600 tons of an alcohol-containing motor spirit (Dynalkol) the composition of which (according to the "Chemische Industrie," November 9) is 70 parts benzine, 26 parts anhydrous alcohol and 4 parts benzole.

Interchangeable Laboratory Glassware

Standardised Units with Ground Glass Joints

THE idea of assembling chemical apparatus from standard parts, fitted with interchangeable conical joints, to perform any of the normal laboratory operations, has been known for many years. Such a method offers many obvious advantages, but the high prices hitherto prevailing have confined its use to those operations where the corrosive power of the reactants as in nitrations, etc., or the delicacy of the product, as in biochemical work, have excluded the use of rubber or cork. Its adoption has been further delayed by faulty design and over-multiplicity of components. Quickfit and Quartz, Ltd., however, have now entered this field, due to a conviction that the price of such interchangeable components is capable of conside able reduction, and that with proper attention to



A typical assembly of Laboratory Apparatus with conical ground glass joints.
Quickfit and Quartz Ltd.

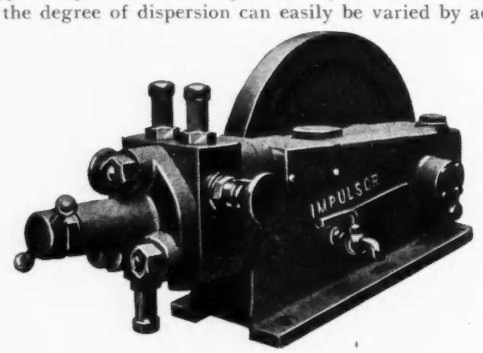
design, the system should achieve immediate popularity among laboratory workers. To this end they have carefully adapted mass production methods to an industry formerly regarded as the sole preserve of the skilled craftsman. The six standard " Quickfit " component sizes which follow British Standard Specification No. 572 (1934) adequately cover all normal laboratory requirements, but other sizes can be supplied if specially asked for. One size only is employed for the interconnecting joints of all assemblies; approximately ½-in. bore, it is large enough to give ample passage to vapours and to obviate any errors or accidents due to constrictions in the apparatus.

There is nothing unwieldy about apparatus assembled on the " Quickfit " system. Thoughtful design has made possible a degree of compactness with strength which will appeal strongly to all laboratory workers. Design has rendered the " Quickfit " system as adaptable as it is simple and compact, and assemblies for almost any chemical operation (filtration, extraction, distillation, fractionation, evolution, washing or drying of gas), can be quickly and easily effected by what is simply a rearrangement of the same component parts. The advantages of this system are not merely those of cost and convenience. The use of " Quickfit " apparatus makes possible higher standards of accuracy and precision in laboratory work and increased purity of product. The connecting joints alone consititute an important safeguard against quantitative losses. The high degree of accuracy with which they are made ensures a tight seal without forcing the joints together; the dry joint is ether-tight and when lightly greased vacuum-tight. All parts are quickly and cheaply replaceable, and this is particularly advantageous in the case of such types of apparatus as the Soxhlet extractor, water estimator, etc., in which a small breakage formerly necessitated the replacement of the whole apparatus.

An Advance in Emulsion Making

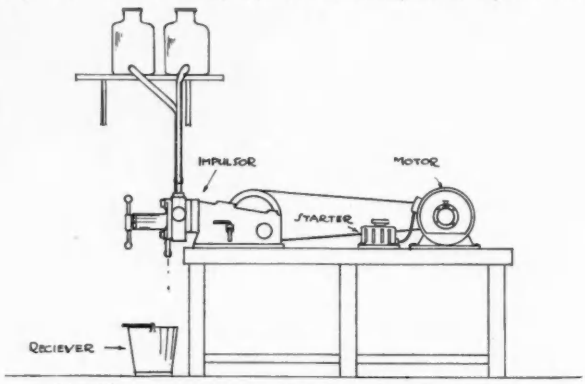
Mixing and Emulsification in One Operation!

A REMARKABLE advance in the mechanical preparation of emulsions is obtained by the use of the Impulsor emulsifier, which is supplied by A. Gallenkamp and Co., Ltd. In this emulsifier the degree of dispersion can easily be varied by adjust-



Impulsor Emulsifier.
A. Gallenkamp and Co., Ltd.

ing the spring compression in the head of the machine, which, moreover, is designed to work up to pressures of 3,500 lb. per sq. in. and the power required varies according to the pressure and output. No premixing tanks or feed pumps are required. The emulsifying head is easily cleaned, and no



Working Arrangement for Impulsor Emulsifier.

packing whatsoever employed, thus ensuring freedom from bacteriological contamination in the resulting products.

By utilising a new and patented principle the Impulsor emulsifier is able to perform the operations of premixing and homogenising simultaneously. No longer is an elaborate mixing apparatus required in conjunction with homogenising

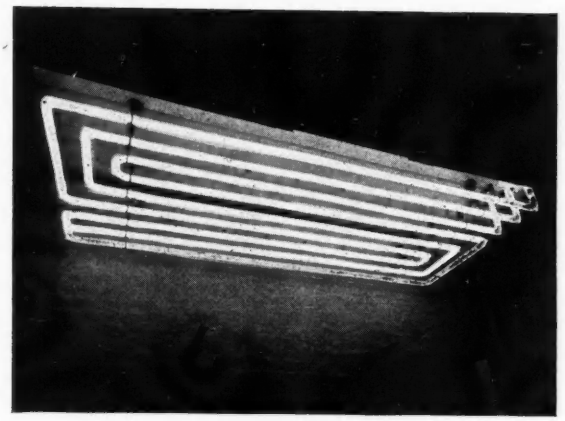
machinery for the preparation of stable emulsions. As the premixing process is usually a lengthy one, a considerable saving is also effected in plant, time and labour costs by the use of this emulsifier. The principle which makes possible such a revolution in emulsion-making is simple and straightforward. The fluids under treatment are subjected to violent oscillations of pressure before being ejected at high velocity through a narrow orifice. The operation is a continuous one and every portion of the liquid undergoes, in turn, the same amount of treatment, resulting in uniform and consistent products. The capacity of the machine varies from 10 to 15 gallons per hour dependent upon the viscosity of the material. Power requirements are 1 h.p., when operating at a pressure of 3,500 lb. per sq. in. The overall dimensions are 24 in. × 9in. × 12 in. high.

Daylight Variability

A New Means to Assist Colour Matching

VARIABILITY in daylight cannot be controlled, consequently colours of similar hue often seem to vary during changing periods of natural daylight, a phenomenon which makes the task of accurately matching colours in natural daylight a far more difficult task than many people imagine. The solution to this difficulty now appears to have been found in a new system of lighting known as " Claudegen " artificial daylight, which maintains an absolutely constant standard of light, thereby ensuring a constancy of appearance of colours of the same hue.

The genuineness of this claim can best be illustrated, according to the illumination experts of the General Electric Co., Ltd., by an experience which befell one of their clients, who produced a number of samples of dyed silks which had previously been carefully " matched " under daylight conditions. On inspecting these samples by means of " Claudegen " artificial daylight it was immediately found that a number of these samples were by no means a perfect match.



G.E.C. "Claudegen" Daylighting Unit
General Electric Co., Ltd.

The prospective user was at first sceptical, and said that such lighting was useless for his purpose. On taking the samples to a window, however, and examining them in London daylight, it was found that the discrepancies disclosed by the " Claudegen " artificial daylight were also quite apparent under the natural daylight, while all those samples which matched under the artificial daylight also matched in the natural daylight. The result of this test satisfied him that the appearance of colours under natural daylight conditions varied considerably, and that " Claudegen " artificial daylight emphasised the variations in tone to a greater degree than did natural daylight.

" Claudegen " artificial daylight enables the most delicate shades of colour to be matched to a degree of accuracy which it is impossible to attain in natural daylight. Further, it has been found that this method of lighting permits of the detection of blemishes in the finish or texture of textiles during manufacture, and this obviates the possibility of the error being perpetuated throughout all the processes of manufacture.

A New Type of Gilled Tube

25 per Cent. Greater Heat Transfer Efficiency

A NEW departure in mild steel gilled tubing, with distinct advantages for heating, cooling, humidifying and air-conditioning has been introduced by G. A. Harvey and Co. (London), Ltd., as the " Harco " hot-shrunk tapered gilled tube. This new type of gill has no crimp and is twice as wide at the bottom of the gill as at the outside edge, the

A typical "Harco" Gilled Tube Heater.
G. A. Harvey and Co. (London), Ltd.

cross section of the strip being tapered. The gill is wound on the tube at a cherry-red temperature and in cooling shrinks tightly on to the tube. Contact between gill and tube is therefore perfect, there being no crimp with cavities in which dust and moisture can lie and rust the root of the gill. Efficiency or rate of heat transfer is approximately 25 per cent. greater than for a crimped gilled tube, and when forced draught is used the efficiency may be 40 to 50 per cent. greater. These new hot-shrunk tapered gilled tubes can be supplied with plain, screwed or flanged ends in lengths up to 22 ft., from 1½ in. to 4½ in. outside diameter of tube, the gills ranging in depth from ½ in. to 1½ in., and varying in pitch from 14 to 48 gills per foot. They can also be supplied built-up into heating and cooling units, with welded joints.

Alumina Laboratory Ware

A New British Development

ALUMINA crucibles, boats, tubes and other pieces, generally similar to many of the standard shapes of Vitreosil (pure fused quartz or silica) ware, are now being manufactured by The Thermal Syndicate, Ltd. The new material can be used for working temperatures up to 1,950° C. and the vessels are suitable for the fusion of metals, alloys and alkalies, while the rate of reaction with concentrated alkaline solutions, fused salts or boiling concentrated sulphuric acid, is very slow. The new material is re-crystallised alumina of high purity, 99.9 per cent. Al_2O_3, and can be recommended for work at temperatures above the limit of Vitreosil (1,100° C.). The chemical properties and high purity already mentioned

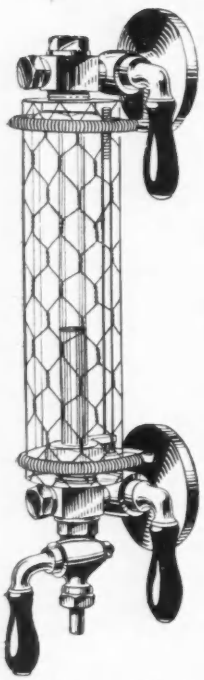
indicate its utility, especially where pure products are required free from contamination by the material of the vessel containing them.

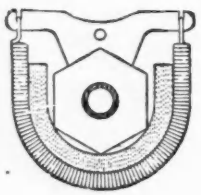
This new alumina ware is made in two grades of porosity, high and low, the former being recommended for more special work. Alumina ware is reasonably resistant to temperature change, but cannot be expected to equal Vitreosil in this respect, so care must be exercised in heating up and cooling down articles; the advantage of the higher permissible operating temperature, however, will offset this.

Gauge Glass Protectors

An Efficient Safeguard at 30 Atmospheres Pressure

THE "Evertrusty" gauge glass protectors supplied by Wallach Bros., Ltd., are claimed to be the most effective safeguard against injury by broken glass thrown about by the bursting of gauge glasses. They are superior to ordinary protectors made simply of toughened glass or wire. Made of a patented process from the best quality of clear white glass, toughened and having strong wire netting embedded therein, the "Evertrusty" protectors will stand almost any pressure or shock to which they may be subjected through gauge glasses bursting behind them. Tests of the severest character have demonstrated that glass made in the manner described is unapproachably the most suitable shield which can be interposed between gauge glasses and the boiler attendants or other persons in the vicinity. To show that these protectors are the most efficient and reliable in the market, it is only necessary to mention that, whereas ordinary toughened glass has been known to fly at a pressure of 40 lb., the "Evertrusty" protectors have not been in the least injured by shocks developing a pressure of 440 lb. or nearly 30 atmospheres. A further advantage is that, even if the glass of the protectors were to be injured, it would not fly, owing to the presence of the embedded wire.





"Evertrusty" Gauge Glass Protector.

Wallach Bros., Ltd.

A New Whatman Filter Paper

THE November issue of "The Towers Messenger," issued by J. W. Towers and Co., Ltd., describes a new grade of Whatman filter paper which possesses unique qualities not to be found in any other paper in the world. Briefly this new paper might be described as a combination of Whatman No. 41 and Whatman No. 54. It is thinner than No. 41, thus washing more easily, while it is as quick filtering and equally retentive. It will not pulp up under the most severe washing with boiling liquids (including alkalis up to usual concentrations), and its purity of cellulose is eminently high. In addition, the manufacturers guarantee an ash content not exceeding 0.008 per cent., which is equivalent to an as weight of 0.000111 gram. on a 15 cm. circle, or 0.000076 gram. per 12.5 cm. circle; the smaller circles, *i.e.*, 11 cm., 9 cm. and 7 cm., thus contain a quantity of ash which for all practical purposes is unweighable.

British Chemical Standards

New Specifications for Vegetable Oils

SIX new British Standard Specifications have just been issued in connection with a comprehensive series of nationally-agreed standards for vegetable oils at present being drawn up by the British Standards Institution. These specifications are for coconut oil (No. 628), ground nut oil (No. 629), olive oil (No. 630), rape seed oil (No. 631), linseed oil for general purposes (No. 632), and sampling of fats and fatty oils (No. 627). They have been prepared by the special Vegetable Oils Committee of the Chemical Division of the British Standards Institution. This committee, which includes representatives of trade interests as well as the Government Departments concerned, has been actively working for the past two years under the chairmanship of Mr. E. R. Bolton, F.I.C., M.I.Chem.E. Limits are laid down in the new specifications for impurities, colour, refractive index, iodine value, saponification value and acidity, etc., whilst standard methods for determining these properties are included in appendices.

The details of the tests adopted have been arrived at after careful examination of existing methods of analysis, particularly from the standpoint of accuracy and reliability, and in many cases experimental work has been carried out by members of the committee in practical verification of the methods. The limits specified have been fixed by the principal users and suppliers.

British Standard Specification No. 627, for the sampling of fats and fatty oils, deals with the general precautions to be taken and the procedure to be adopted in the sampling of oils and fats in packages or in bulk. Methods are given for the collection of the gross sample and for the preparation from the gross sample of the final sample. Recommended suitable forms of sampling instruments are also given. The specification should serve a very useful purpose as a guide to the sampling of fatty oils, and forms a valuable reference in respect of the newly-issued specifications.

Other specifications are nearing completion for castor oil, tung oil, refined cotton seed oil, crude palm kernel oil, crude maize oil and sesame oil.

Cold Water in Metal Corrosion

German Congress of Scientific Associations

THE leading German technical and scientific associations, who united to form a joint council in connection with corrosion and its prevention, have decided to hold the fifth annual Congress in Berlin on November 18-19. At the previous meetings, corrosion was dealt with very broadly, a variety of papers being presented, but this time it has been decided to confine the attention of the Congress to "The corrosion of metallic materials of construction by cold water." This subject is of vital importance in all branches of industry, but particularly is it of interest to gas and water engineers and industries concerned with the disposal of effluents, more particularly from chemical works. A number of questions of technical and economic importance will be dealt with for the first time, the various speakers being experts on their particular subjects.

In addition to the papers of more general interest, such as those dealing with the damage done by water corrosion, and the methods employed for its prevention, it is proposed to present papers dealing with rapid methods for the determination of rate of corrosion, and the standardisation of the laboratory equipment and methods of expressing the results of corrosion tests. A number of well-known specialists from abroad will take part in the discussion, among them being Professor Palmaer, of Stockholm, Professor W. J. Mueller, of Vienna, and Professor Kohlschütter, of Berne. The administration of the Congress has been entrusted to the Verein deutscher Chemiker, Potsdamerstr. 103a, Berlin.

Points from Manufacturers' Literature

Plywood Trays and Boxes

VARIOUS TYPES OF PLYWOOD TRAYS and boxes are illustrated in a new leaflet of W. Lusty and Sons, Ltd. This firm is able to offer every type of factory tray made in wood of any description and to any design. All the resources that the most modern and efficient machinery and modern method of production can offer are at the service of the tray and box user.

Induction Motors

INDUCTION MOTORS, supplied by the Fuller Electrical and Mfg. Co., Ltd., are made for single, two- and three-phase circuits. Large stocks of completed three-phase motors are available for "off the shelf" delivery, whilst a large stock of finished parts makes possible a short delivery service for any circuit the prospective user may specify. The requirements of location are met by an interchangeable system of end brackets fitted with dust-proof ball and roller bearings as standard. These end brackets cover total enclosure, drip-proof enclosure, pipe ventilated enclosure, and open protected enclosure.

Pressure, Vacuum and Contents Gauges

PRESSURE, VACUUM AND CONTENTS GAUGES in great variety are illustrated and described in List G/21 of Negretti and Zambra. The dial and edgewise patented diaphragm type draught gauges are specially recommended for indicating small pressures or suctions in boiler plants, gas plants, kilns, furnaces, ventilating and exhausting fans, etc., where accurate readings are required under general industrial conditions. These instruments represent a great advance over previous types. The greatest care has been taken in their design and manufacture to overcome as far as possible errors due to zero shift, friction, vibration, etc., with the result that in these gauges all errors and defects have been practically eliminated. They avoid the periodic cleaning and refilling which is necessary with liquid gauges, and they require no attention over many years of service. Dial type contents gauges or indicators can be calibrated in depth, volume, weight or with two or more scales for varying specific gravities. One indicator may be manifolded to several tanks, or for readings in more than one position, several indicators may be connected to one tank. The indicator is provided with a four-way control cock with connections to tank, gauge, pump and vent, so that the zero reading may be checked at any time.

Heat Economy and Control

RING BALANCE METERS described in a new leaflet of Elliott Brothers (London), Ltd., are designed to measure draught and pressures of low pressure gas, air or water and, in addition, in conjunction with orifice plates, the flow of such gases, etc. This method of measurement ensures the greatest accuracy with even the smallest variations. The ring balance is a drum, pivoted on knife edges, half-filled with liquid and provided with a counterweight. The space above the surface of the liquid is divided into two by a partition, the pressures to be measured being conveyed to the two spaces by means of flexible tube connections. The drum is therefore, in effect, a U-tube, balanced on knife edges. When the two pressures differ from each other, due to an alteration in draught, or flow through the orifice plate, the liquid is displaced, but the drum rotates until the counterweight in its new position balances the displaced liquid. The angle through which the drum has revolved is then a measure of the pressure difference which caused the displacement. The accuracy is not affected by the quantity or specific gravity of the liquid used. The advantages of such a meter are extreme accuracy for low-pressure measurements, very small loss of head when used as flowmeter (there are no moving parts in the pipe-line), distant transmission of readings is possible if desired, and a range which can be easily altered.

Copper-Coated Glassware

COPPER-COATED GLASSWARE in the form of beakers, flasks, etc., of any shape or size can be supplied with the copper electrolytically deposited on the outside. According to a leaflet issued by A. Gallenkamp and Co., Ltd., the advantages of this copper-coated glassware are two-fold: (*a*) Liquid is saved in the event of the glass cracking, and (*b*) heat is quickly distributed over the bottom of the vessel. Such glassware is specially recommended for works and research laboratories.

Laboratory Balances

THE NEW SERIES OF APERIODIC PRISMATIC REFLECTING BALANCES described in a loose leaf folder issued by L. Oertling, Ltd., marks a really great advance in balance design. Handling of small weights and riders is eliminated, and the saving in time and fatigue where many weighings have to be made is enormous. At the same time, risk of error is greatly reduced. The actual graticule is attached to the end of the pointer and the enlarged reflection of the scale is projected to a convenient position at the top of the balance case. This device has been thoroughly tested and balances fitted with it are in highly successful use in various government, university and industrial laboratories. L. Oertling, Ltd., are an entirely British firm, having been established in London as long ago as 1849. This is mentioned because users of precision balances, whilst appreciating the quality of Oertling instruments, do not always realise that they are entirely a British product.

Refractory Insulation

THE ADVANTAGES INCURRED BY THE USE OF REFRACTORY INSULATION are now universally acknowledged, and in presenting a new brochure on H.T.1. brick, Gibbons (Dudley), Ltd., have no hesitation in claiming this brick to be the best example of this type of refractory as produced in this country. This material has been evolved after years of research work and has been thoroughly tried out in practice. It may be used to advantage in practically every type of industrial heating plant from the smallest heat treatment furnace to a coke oven. It is a highly refractory material possessing six times the heat insulation properties of a normal firebrick. Its use either as a backing to the normal inner refractory wall, or, as is possible in many cases, to form the inner lining, makes possible a thinner and lighter construction generally. By reason of the low thermal capacity of such a construction, and the heat reflecting properties of such a brick, very considerable economies in fuel are affected.

Dial Pressure Gauges

A DESCRIPTIVE CATALOGUE of dial pressure gauges and gauge connections supplied by the Budenberg Gauge Co., Ltd., gives some useful instructions for the fixing and use of pressure gauges. It describes and illustrates various Bourdon, Schaffer diaphragm and steel-tube gauges for general use: also electric alarm and control gauges. For use in chemical works Schaffer gauges have the advantage that the steel diaphragm can be covered with a silver, platinum or stainless steel protection plate, thereby enabling it to resist the corroding attack of any particular chemical. If a gauge is required to work in the presence of ammonia or other fumes which attack brass, it can be made of iron throughout and fitted in a hermetically sealed case. These gauges are also made with special connections which enable the underside of the diaphragm to be examined and cleaned at any time, this arrangement being of particular value in certain processes—such as the making of food products. Bourdon gauges are adapted for any pressure medium having no deteriorating effect on bronze. Schaffer diaphragm gauges, however, are more affected by high temperature than are Bourdon gauges, and if used for steam they must be adequately protected against overheating.

Chemical and Allied Stocks and Shares

Current Quotations

THE following table shows this week's Stock Exchange quotations of chemical and allied stocks and shares compared with those of last week. Except where otherwise shown the shares are of £1 denomination.

Name.	Nov. 12.	Nov. 5.
Anglo-Iranian Oil Co., Ltd. Ord	67/6	68/1½
,, 8% Cum. Pref.	36/6	35/9
,, 9% Cum. Pref.	37/9	37/3
Associated Dyers and Cleaners, Ltd. Ord.	2/6	2/6
,, 6½% Cum. Pref.	5/3¾	5/3¾
Associated Portland Cement Manufacturers, Ltd. Ord.	65/-	65/-
,, 6½% Cum. Pref.	26/6	26/6
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	2/6	2/6
Berger (Lewis) & Sons, Ltd. Ord.	65/-	64/4½
Bleachers' Association, Ltd. Ord.	6/10½	7/6
,, 5½% Cum. Pref.	12/6	12/6
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	20/-	20/-
Boots Pure Drug Co., Ltd. Ord. (5/-)	48/3	49/-
Borax Consolidated, Ltd. Pfd. Ord. (£)	100/-	98/9
,, Defd. Ord.	17/9	17/6
,, 5½% Cum. Pref. (£10)	£11	£11
,, 4½% Deb. (1st Mort.) Red. (£100)	£109	£109
,, 4½% 2nd Mort. Deb. Red. (£100)	£102	£102
Bradford Dyers' Association, Ltd. Ord.	10/-	10/-
,, 5% Cum. Pref.	13/9	13/9
,, 4% 1st Mort. Perp. Deb. (£100)	£88	£88
British Celanese Ltd., 7% 1st Cum. Pref.	25/6	25/6
,, 7½% Part. 2nd Cum. Pref.	22/9	23/6
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	5/9	5/9
,, 4% 1st Mort. Deb. Red. (£100)	£92	£92
British Cyanides Co., Ltd. Ord. (2/-)	3/6	3/6
British Drug Houses, Ltd. Ord.	18/9	18/9
,, 5% Cum. Pref.	21/3	21/3
British Glues and Chemicals, Ltd. Ord. (4/-)	6/9	6/9
,, 8% Pref. (Cum. and Part.)	28/1½	28/1½
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	46/10½	46/10½
,, 5½% Cum. Pref.	26/3	26/3
,, 4½% First Mort. Deb. Red. (£100)	£106/10/-	£106/10/-
British Oxygen Co., Ltd. Ord.	112/6	110/-
,, 6½% Cum. Pref.	32/6	32/6
British Portland Cement Manufacturers, Ltd. Ord.	87/6	112/6
,, 6% Cum. Pref.	29/6	29/6
Bryant & May, Ltd. Pref.	66/3	66/3
Burt, Boulton & Haywood, Ltd. Ord.	18/9	18/9
,, 7% Cum. Pref.	27/6	27/6
,, 6% 1st Mort. Deb. Red. (£100)	£105/10/-	£105/10/-
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	108/9	108/9
,, 4% 1st Mort. Deb. Red. (£100)	£96/10/-	£96/10/-
Calico Printers' Association, Ltd. Ord.	10/7½	10/7½
,, 5% Pref. (Cum.)	15/11¼	15/3¾
Cellulose Acetate Silk Co., Ltd. Ord.	15/-	13/9
,, Deferred (1/-)	2/7½	2/4½
Consett Iron Co., Ltd. Ord.	11/3	10/9
,, 8% Pref.	28/9	27/6
,, 6% First Deb. stock, Red. (£100)	£107/10/-	£106
Cooper, McDougal & Robertson, Ltd. Ord.	32/6	32/6
,, 7% Cum. Pref.	28/9	28/9
Courtaulds, Ltd. Ord.	53/9	53/9
,, 5% Cum.	24/4½	24/4½
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre Pref.	25/-	25/-
,, Cum. 6% Pref.	28/9	28/9
,, 6½% Cum. Pref.	29/4½	29/4½
,, 7½% "A" Cum. Pref.	30/-	30/-
Distillers Co., Ltd. Ord.	93/6	92/6
,, 6% Pref. Stock Cum.	31/6	31/6
Dorman Long ¼ Co., Ltd. Ord.	21/6	21/-
,, Pref. Ord.	30/-	28/9
,, 6½% Non-Cum. 1st Pref.	23/3	23/3
,, 8% Non-Cum. 2nd Pref.	20/7½	20/7½
,, 4% First Mort. Perp. Deb. (£100)	£102/10/-	£102/10/-
,, 5% 1st Mort. Red. Deb. (£100)	£105/10/-	£105
English Velvet & Cord Dyers' Association, Ltd. Ord.	4/4½	3/9
,, 5% Cum. Pref.	8/9	7/6
,, 4% First Mort .Deb. Red. (100)	£72/10/-	£70
Fison, Packard & Prentice, Ltd. Ord.	40/-	38/1½
,, 7% Non-Cum. Pref.	31/3	31/3
,, 4½% Debs. (Reg.) Red. (£100)	£106	£106
Gas Light & Coke Co. Ord.	28/-	27/6
,, 3½% Maximum Stock (£100)	£89/10/-	£90
,, 4% Consolidated Pref. Stock (£100)	£106/10/-	£106/10/-
,, 3% Consolidated Deb. Stock, Irred. (£100)	£88/10/-	£86/10/-
,, 5% Deb. Stock Red. (£100)	£116/10/-	£116
,, 4½% Red. Deb. Stock (1960-65) (£100)	£113/10/-	£114
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	14/4½	14/4½
,, 7% Prefd. Ord. (10/-)	13/9	13/9
,, 7% Cum. Pref.	28/9	30/-
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	24/4½	24/4½
,, 6½% Cum. Pref.	28/9	28/9
Imperial Chemical Industries, Ltd. Ord.	36/6	37/-
,, Deferred (10/-)	8/10½	8/10½
,, 7% Cum. Pref.	33/9	33/6
Imperial Smelting Corporation, Ltd. Ord.	15/-	15/-
,, 6½% Pref. (Cum.)	24/3	24/3
International Nickel Co. of Canada, Ltd. Cum.	$35½	$33½
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	105/-	105/-
,, 4% Mort. Deb. Red. (£100)	£98/10/-	£98/10/-
Laporte, B., Ltd. Ord.	118/9	117/6
Lawes Chemical Co., Ltd. Ord. (1/-)	6/3	6/3
,, 7% Non-Cum. Part Pref. (10/-)	10/-	10/-
Lever Bros., Ltd. 7% Cum. Pref.	32/-	32/-
,, 8% Cum. "A" Pref.	32/-	32/-
,, 20% Cum. Prefd. Ord.	77/6	77/6
,, 5% Cons. Deb. (£100)	£106	£106
,, 4% Cons. Deb. (£100)	£103	£103
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	1/3	1/3
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£40	£40
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, 7½% Cum. Pref.	1/6¾	1/6¾
Pinchin, Walton & Co., Ltd. Ord. (10/-)	43/-	42/6
,, 1st Pref. 6½% Cum.	31/6	31/6
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£70	£69
Reckitt & Sons, Ltd. Ord.	113/1½	105/-
,, 4½% Cum. 1st Pref.	25/-	25/-
Salt Union, Ltd. Ord.	40/-	40/-
,, Pref.	46/3	46/3
,, 4½ Deb. (£100)	£109/10/-	£109/10/-
South Metropolitan Gas Co. Ord. (£100)	£136/10/-	£134/10/-
,, 6% Irred. Pref. (£100)	£149/10/-	£149/10/-
,, 4% Pref. (Irred.) (£100)	£107	£107
,, Perpetual 3% Deb. (£100)	£87/10/-	£85
,, 5% Red. Deb. 1950-60 (£100)	£115/10/-	£115/10/-
Staveley Coal & Iron Co., Ltd. Ord.	47/6	47/6
Stevenson & Howell, Ltd. 6½% Cum. Pref.	26/3	26/3
Triplex Safety Glass Co., Ltd. Ord. (10/-)	81/3	83/9
Unilever, Ltd. Ord.	32/6	33/1½
,, 7% Cum. Pref.	28/9	28/3
United Glass Bottle Manufacturers, Ltd. Ord.	43/-	41/-
,, 7½% Cum. Pref.	33/-	33/-
United Molasses Co., Ltd. Ord. (6/8)	20/-	20/-
,, 6% Cum. Pref.	25/-	25/-
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	8/3	8/3
,, 7% Cum. Pref.	25/-	24/4½
,, 6% Deb. Red. (£100)	£102	£101

From Week to Week

FURNIVALL & CO. (CHEMISTS), LTD., of 2 Oakland Park Estate, Sticklepath, Barnstaple, have changed their name to Furnivall and Co. (Barum), Ltd.

THE FORESTRY DEPARTMENT of Georgetown, British Guiana, announces the discovery, through private research, of an economical method of extracting the gum from Wallaba wood pulp, which removes one of the biggest obstacles to pulp production in this colony.

GLASGOW CORPORATION GAS CHEMICAL WORKS invite offers for the supply and delivery of best-quality hand-picked causticising lime at Proven Chemical Works, Glasgow; the total estimated quantity required is about 1,000 tons. Tenders are due by November 21.

PROVOST MCKINLAY intimated at a meeting of Irvine Town Council on Tuesday that he had been officially advised by Imperial Chemical Industries, Ltd., that a new explosive factory was to be built on the site of the old Kyle chemical factory near Irvine Harbour. Plans would be lodged immediately and building operations owuld be commenced before the new year. The site is about half a mile from the old war-time factory, operations in connection with the reopening of which were arranged for recently.

THE FOUR OAKS SPRAYING MACHINE CO. has published an attractive brochure setting out the list of awards gained by the company at the Royal Horticultural Society's trials at Wisbey last July. The firm secured five awards of merit out of a total of twelve given, and a total of eleven awards out of a total of twenty-four awards given, including power sprayers. These awards are only made every ten years.

EXPORTS OF CERTAIN GOODS from the United Kingdom to Italian territory are prohibited under the Treaty of Peace (Covenant of the League of Nations) Order, 1935, dated October 25. The schedule of prohibited goods includes mustard gas, lewisite, ethyldichlorarsine, methyldichlorarsine, ethyl-iodo-acetate, chlorocetophenone, chlorosulphonic acid, diphenylaminechloroarsine, bromobenzylcyanide, diphenylchloroarsine, diphenylcyanoarsine phosgene, chloropicrin and all other noxious substances intended for offensive or defensive purposes in warfare.

THERE WERE NINETY-NINE FURNACES in blast at the end of October, according to the British Iron and Steel Federation's monthly report. The production of pig-iron in October amounted to 544,300 tons, compared with 529,600 tons in September, and 527,100 tons in October, 1934. The month's production includes 131,000 tons of hematite, 284,500 tons of basic, 105,100 tons of foundry, and 10,500 tons of forge pig iron. The production of steel ingots and castings in October amounted to 907,300 tons, compared with 855,900 tons in September, and 812,000 tons in October, 1934. The October production of steel ingots and castings is the highest figure since March, 1927.

THE CEMENT AND CONCRETE ASSOCIATION was registered on November 9 as a company limited by guarantee without share capital with 25 members, each liable for £5 in the event of winding-up. The word "limited" is omitted from the title by licence of the Board of Trade. The objects are to promote, assist, maintain and protect by means of publicity, propaganda, research and otherwise the trade and business of manufacturers in Great Britain, Northern Ireland and the Isle of Man, of cement, concrete and similar substances, etc. The management is vested in a council, the first members of which are: Aberthaw and Bristol Channel Portland Cement Co., Ltd., Alpha Cement, Ltd., Associated Portland Cement Manufacturers, Ltd., British Portland Cement Manufacturers, Ltd., Eastwoods Cement, Ltd., G. and T. Earle, Hull, Masons Portland Cement Co., Ltd., Claydon, near Ipswich, Rugby Portland Cement Co., Ltd., Rugby, and the Tunnel Portland Cement Co., Ltd. The registered office is at 52 Grosvenor Gardens, S.W.1.

A CONFERENCE under the auspices of the Road and Building Materials Group of the Society of Chemical Industry will be held at the Royal Agricultural Hall, Islington (in Congress Hall B) next Tuesday morning in connection with the eighth Public Works Roads and Transport Congress and Exhibition. The chair will be taken at 11 a.m. by Professor R. G. H. Clements, who will be supported by the president of the Society, Mr. W. A. S. Calder: Mr. W. H. Glanville (Building Research Station, D.S.I.R.) will read a paper, "Reinforced Concrete in Roads and Buildings." Members who wish to attend the conference or to visit the exhibition at any time during the week November 18 to 23, must apply to the hon. secretary of the Road and Building Materials Group, Society of Chemical Industry, 46 Finsbury Square, E.C.2, when, so far as the supply permits, he will have posted to him a season ticket to the exhibition for the week, a programme of the meetings of the week, and a pre-print of Mr. Glanville's paper. On Tuesday evening at 8 p.m., in the rooms of the Chemical Society, Burlington House, a joint meeting with the Plastics Group of the Society will be held, when Mr. L. F. Cooling, M.Sc., will read a paper on "The Physical Properties of Clay Soils and Some Aspects of their Mechanical Behaviour." The paper will be followed by a discussion, after which refreshments will be served.

DAMAGE ESTIMATED at between £2,000 and £3,000 was caused by a fire which broke out early on November 6 at the Paragon Works, Smithy Bridge, near Rochdale, owned by the Deanhead Chemical Co. The cause of the fire is unknown.

MEMBERS OF THE INSTITUTE OF BREWING will hold a meeting and dinner at the Royal Hotel, Bristol, on Friday, November 29, when papers on the Institute's research work will be read by Mr. G. T. Cook, Mr. H. M. Lancaster and Mr. W. J. Watkins. At the dinner members and non-members present will be the guests of The Bristol Brewery Georges & Co., Ltd. A visit will be made to the brewery in the afternoon.

A NEW METHOD for the production of urea has been discovered by Professor A. Werner at the Chemical Institute of Dublin, Ireland. Professor Werner, who did considerable scientific work on the properties of peat and who studied particularly the purifying influence of peat on certain organic liquids, found that pure urea can be obtained by mixing peat with ammonium hydroxide and conducting uniform current of carbon dioxide through the mixture. This production of urea takes place at atmospheric pressure.

THE next ordinary general meeting of the Society of Glass Technology will be held in the Fuel Lecture Theatre, Leeds University, on Wednesday, November 20, at 2 p.m. There will be a general discussion on Glass Melting Furnaces, and the following papers will be communicated:—"The Control of Glass Melting Furnaces," by W. Maskill, B.Sc., Ph.D.; "A Survey of Surface Temperatures of a Glass Tank Melting Furnace," by H. S. Y. Gill, B.Sc.Tech., and N. A. Nichols, M.Sc.Tech.; "The Heat Balance of a Tank Furnace," by H. S. Y. Gill, B.Sc.Tech.; "The Classification of Tank Furnaces," by Professor S. S. Berman; "Producer Gas in the Glass Factory," by F. J. Hurlbut, M.A.

A NET PROFIT of $7,742,584.64—equivalent to 50 cents per share on the common stock after allowing for preferred dividend—is reported for the third quarter of 1935 in the quarterly statement of the International Nickel Co. of Canada, Ltd. This compares with a net profit of $5,420,615.13 for the second quarter, and with $4,917,627.24 for the first three months of the current year; and it brings the net profit for the first nine months to the equivalent of $1.14 per share. The consolidated balance sheet to September 30 discloses that all funded indebtedness has been eliminated, the balance of the outstanding debenture stock of the Mond Nickel Co., Ltd., having been retired on August 1. Current assets are $54,805,756.36 and include $26,782,384.13 in cash and government securities. The total of earned and capital surplus now amounts to $101,373,309.84. In an accompanying letter to shareholders, Robert C. Stanley, President of the Company, points out that coinage is one of the oldest applications for nickel, yet at the present time absorbs only two and a half per cent. of the world's output.

JOHN BOWES AND PARTNERS, LTD., Durham colliery owners, of Milburn House, Newcastle-on-Tyne, are to erect a coke-oven plant, by-product plant and large coal washery at Monkton, near Jarrow-on-Tyne. A start is to be made at once, the contracts for the work having been allocated to the Birtley Co., Co. Durham, and the Koppers Coke Oven Co., of Sheffield, the managing director of both firms being Col. K. C. Appleyard of Birtley. As far as possible the whole of the plant will be made on the North-East. It is estimated that the total plant will cost £250,000. The coke-oven installation will comprise 33 re-generative combination circulation ovens with cross over re-generators so built as to permit of their being fired by low grade gas if that should be required in the future. A complete coke-handling plant is included with blending bunker and service bunker of 1,000 tons capacity each together with coke-handling and grading plant. The by-product installation is to be of the latest Koppers type including the most advanced practice in the production of benzol for use as motor spirit and tar for road works.

THE CONSTRUCTION OF THE PLANT of the Lignite-Petrol Co. to produce petrol from lignite has so far made little progress. This company was established in October, 1934, jointly by the German lignite producers on the demand of the Minister of Economics, with a share capital of Rm.100,000,000, of which so far only Rm.10,000,000 has been paid. It had been expected in October, 1934, that the first plant would start operation by the end of 1935. It has, however, now been found impossible to do so, and the first plant will start output probably by the middle of 1936. In order to finance the construction of the plant the German lignite producers have been asked to pay up the remainder of Rm.90,000,000 of the share capital before the end of March, 1936. The first plant for the production of petrol is now under construction at Boehlen, near Leipzig. The plant will be capable of producing 1,500,000 metric tons of briquettes from lignite annually, thus producing 200,000 metric tons of distilled lignite tar, which will be hydrogenated in order to obtain the petrol. Another plant of the Lignite Petrol Co. is to be established near Magdeburg.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

CONDITIONS have remained steady in the markets for general heavy chemicals, wood distillation products and intermediates, but there have been a number of price changes in rubber chemicals, coal tar products, pharmaceutical and perfumery chemicals and essential oils. Increases are announced in the prices of naphthalene, pitch and toluol, while all the changes in the perfumery section have been in a downward direction. Of the seven items showing a change in the essential oil market, six have been reduced in price, while petitgrain has advanced from 5s. 3d. to 6s. per lb. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

LONDON. — Prices remain steady, and there are no changes to report from last week. In the coal tar products section pitch is quoted at about 32s. 6d. to 35s. per ton, fo.b. East Coast port, for this season's delivery.

MANCHESTER.—Armistice Day activities and the election have not been conducive to busier trading conditions, although the general experience on the Manchester chemical market this week has been that the latter factor has been a good deal less depressing than is normally the case. Price conditions in chemicals are firm pretty well all round and are expected to continue so in respect of contract values over next year. The by-products market locally has remained an active centre so far as most of the light materials are concerned, and extremely firm prices are being indicated. In other departments a quietly steady trade has been reported in the heavy chemicals, and fairly good quantities of the alkalis, heavy acids, and textile chemicals generally are being taken into consumption locally. Traders are anticipating active contract buying during the next few weeks.

SCOTLAND. — The General Election had a definite slowing effect on the buying programme of most industrial concerns during the week. Business in chemicals was rather quieter both for home trade and export. Prices continue steady at about previous figures with only slight changes to report. Lead and copper products, however, are inclined to be dearer in sympathy with the metals.

Price Changes

Rubber Chemicals.—INDIA-RUBBER SUBSTITUTES, white 4¼d. to 4⅜d. per lb., dark, 3½d. to 4¼d.; LITHOPONE 30%, £16 10s. to £17 per ton.

Coal Tar Products.—NAPHTHALENE, purified crystals, £13 10s. per ton; PITCH, medium soft, 35s. to 36s. per ton; TOLUOL, 90%, 2s. 3d. to 2s. 4d. per gal., pure 2s. 6d. to 2s. 7d.

Pharmaceutical and Photographic Chemicals.—MENTHOL, A.B.A. recryst. B.P., 14s. 3d. per lb.

Perfumery Chemicals.—COUMARIN, 7s. per lb.; CITRAL, 7s.; GERANIOL (Palmarosa), 11s. 6d.; MUSK AMBRETTE, 14s. 9d.; KETONE, 15s.; XYLOL, 4s. 6d.

Essential Oils.—ANISE, 2s. 1d. per lb.; CANANGA, Java, 14s. 6d.; CASSIA, 80/85%, 5s. 6d.; OTTO OF ROSE, Anatolian, 30s. per oz., Bulgarian, 45s.; PEPPERMINT, Wayne County, 9s. 6d. per lb.; PETITGRAIN, 6s.

All other prices remain unchanged.

General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80%, £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech., 80%, £38 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—Commercial granulated, £25 10s. per ton; crystal, £26 10s.; powdered, £27 10s.; extra finely powdered, £29 10s. packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. SCOTLAND: Crystals, £26 10s.; powder, £27 10s.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 1s. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £40 to £45 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £49 to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11¼d., less 5%. SCOTLAND: 1s. 0¼d. less 5%. MANCHESTER: 1s. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £34 per ton, c.i.f. U.K ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £15 per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £21 to £22, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—4s. 10d. to 5s. 1d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¾d. per lb. LONDON: 4¾d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb.; liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £25 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD, ACETATE.—LONDON: White, £36 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £34.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £25 to £27 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £42 10s.

LITHOPONE.—30%, £16 10s. to £17 per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PHENOL.—6¾d. to 7¼d. per lb. to June 30, 1936.
POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.
POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5½d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.
POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38 10s.
POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.
POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.
POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.
POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B P., 1s.
POTASSIUM PRUSSIATE.—LONDON: Yellow, 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¾d. ex store. MANCHESTER: Yellow, 8½d.
SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.
SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.
SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.
SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—LONDON: £21 10s. SCOTLAND: £20 15s.
SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.
SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.
SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—£32 10s. per ton. SCOTLAND: 3⅝d. per lb.
SODIUM CHROMATE.—4d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.
SODIUM META SILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM IODIDE.—B.P., 6s. per lb.
SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.
SODIUM PERBORATE.—10%, 9¼d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.
SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.
SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHUR.—£9 10s. to £9 15s. per ton. SCOTLAND: £8 to £9.
SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 4s. 8d. per lb. in 1-cwt. lots.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINZ SULPHATE.—LONDON: £12 per ton. SCOTLAND £10 10s.
ZINC SULPHIDE.—10d. to 11d. per lb.

Coal Tar Products

ACID CRESYLIC.—90/100%, 1s. 9d. to 2s. 3d. per gal., according to specification; pale 98%, 1s. 6d. to 1s. 7d; dark, 1s. 2d. to 1s. 3d.. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s 1d.; high boiling acid, 2s. 6d. to 3s.
ACID, CARBOLIC.—Crystals, 6¾d. to 7¼d. per lb.; crude, 60's, 1s. 11½d. to 2s. 2½d. per gal. MANCHESTER: Crystals, 7¼d. per lb.; crude, 2s. 4d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.
BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 3½d. SCOTLAND: Motor, 1s. 6½d.
CREOSOTE.—B.S.I. Specification standard, 5¾d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5½d. to 5¾d. SCOTLAND: Specification oils, 4d.; washed oil, 4¼d. to 4¾d.; light, 4½d.; heavy, 4¼d. to 4½d.
NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 7d.; 99%, 11d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Crude, whizzed or hot pressed, £9 per ton; purified crystals, £13 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PYRIDINE.—90/140%, 5s. 6d. to 8s. per gal.; 90/180, 2s. 3d.
TOLUOL.—90%, 2s. 3d. to 2s. 4d. per gal.; pure, 2s. 6d. to 2s. 7d.
XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 4d.
PITCH.—Medium, soft, 35s. to 36s. per ton, in bulk at makers' works.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID NAPHTHIONIC.—1s. 8d. per lb.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.
BENZIDINE HCL.—2s. 5d. per lb.
p-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.
m-CRESOL 98/100%.—1s. 11d. per lb. in ton lots.
DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.
DINITROCHLORBENZENE, SOLID.—£72 per ton.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton, in paper bags.
α-NAPHTHYLAMINE.—Spot, 11½d. per ton., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.
o-NITRANILINE.—3s. 11d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.
NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—10d. per lb.; P.G., 1s. 0½d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—9½d. to 11d. per lb.
p-TOLUIDINE.—1s. 11d. per lb.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 to £9. Grey, £11. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £9 10s.; grey £11 10s.
CHARCOAL.—£4 15s. to £10 per ton, according to grade and locality.
METHYL ACETONE.—40-50%, £43 to £46 per ton.
WOOD CREOSOTE.—Unrefined, 3d. to 1s. 3d. per gal.
WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 6d. per gal.; solvent, 3s. 3d. to 4s. 3d. per gal.
WOOD TAR.—£2 to £2 10s. per ton.

Latest Oil Prices

LONDON, Nov. 13.—LINSEED OIL was steady. Spot, £26 10s. per ton (small quantities), Nov., £23 17s. 6d.; Dec., £24; Jan.-April, £24 5s.; May-Aug., £24 10s., naked. SOYA BEAN OIL was quiet. Oriental (bulk), Dec. shipment, £21 per ton. RAPE OIL was inactive. Crude extracted, £36 10s. per ton; technical refined, £38, naked, ex wharf. COTTON OIL was slow. Egyptian crude, £25 per ton; refined common edible, £29; and deodorised, £31, naked, ex mill (small lots £1 10s. extra). TURPENTINE was easier. American, spot, 45s. 3d. per cwt.
HULL.—LINSEED OIL, spot, quoted £24 15s. per ton; Nov.-Dec., £24 5s.; Jan.-April, £24 7s. 6d.; May-Aug., £24 12s. 6d. COTTON OIL, Egyptian, crude, spot, £25 10s.; edible, refined, spot, £28 10s.; technical, spot, £28 10s.; deodorised, £30 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £23, naked. GROUNDNUT OIL, extracted, spot, £33; deodorised, £36. RAPE OIL, extracted, spot, £35 10s.; refined, £37. SOYA OIL, extracted, spot, £27; deodorised, £30 10s. per ton. COD OIL, f.o.r. or f.a.s., 25s. per cwt. in barrels. CASTOR OIL, pharmaceutical, 45s. per cwt.; firsts, 40s.; seconds, 38s. TURPENTINE, American, spot, 46s. 9d. per cwt.

Inventions in the Chemical Industry

Patent Specifications and Applications

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Insecticidal Fumigants

Volatile organic compounds, serving as insecticidal and like fumigants, are prepared in the form of crystallised addition products with inorganic salts. These addition compounds on treatment with water or water vapour evolve the organic compound as a vapour; they are prepared by treatment of the anhydrous salt with the respective organic compound. Specified addition compounds are those of methyl, ethyl, propyl or butyl formates or acetates with magnesium chloride, calcium chloride, boron fluoride, titanium chloride, or antimony chloride; of methylal or butylene oxide with calcium chloride; of acetone, acetaldehyde, ether or acetonitrile with magnesium bromide; of ether with titanium chloride, boron fluoride or tin chloride; of methyl sulphide with copper chloride or cadmium iodide; and of acetonitrile with aluminium chloride. Similar compounds of formaldehyde may also be prepared. (See Specification 426,398, of W. W. Groves.)

Esterifying Cellulosic Materials

Cellulose esters insoluble in organic solvents are manufactured by esterifying textile materials containing cellulose without alteration of their structure and with retention of their suitability as textile materials, the material in one and the same closed apparatus being esterified, separated from the main quantity of esterifying liquid and, without being washed, finally dried with recovery of the esterifying liquid still adhering to it. The textile materials may be staple fibre, threads, yarns, fabrics or the like, of cotton, flax, hemp or regenerated cellulose. The esterification may be conducted in a closed centrifugal device, the materials being contained in the rotary part of the centrifuge which is slowly rotated during the process. The process may, however, be conducted on the pack system. The final drying with recovery in an undiluted state of the adhering esterifying liquid may be performed by means of a circulating current of hot air and separation of the evaporated acylating agent by means of a condenser. (See Specification 429,152, of Soc. of Chemical Industry in Basle.)

Specifications open to Public Inspection

Metallic magnesium from magnesium oxide, process for manufacture.—Osterreichisch Amerikanische Magnesit A.-G. May 4, 1934. 9064/35.

Vinyl resins, manufacture.—Soc. Nobel Française. May 3, 1934. 9905/35.

Polymers.—Standard Oil Development Co. May 2, 1934. 10725/35.

New decylene compounds, production.—Carbide and Carbon Chemicals Corporation. May 3, 1934. 11671/35.

Esters of glycol ethers.—Carbide and Carbon Chemicals Corporation. May 4, 1934. 11672/35.

Chrysene monosulphonic acid, process for manufacture.—I. G. Farbenindustrie. May 4, 1934. 13125/35.

Bismuth salts, manufacture.—I. G. Farbenindustrie. May 4, 1934. 13263/35.

Derivatives of hydrocyanic acid, manufacture.—Imperial Chemical Industries, Ltd. May 3, 1934. 13305/35.

Specifications Accepted with Date of Application

Valuable condensation products, manufacture and production. Coutts and Co. and F. Johnson (I. G. Farbenindustrie). Feb. 26, 1934. 437,590.

Vinyl derivatives, production.—Kodak, Ltd. April 19, 1933. 437,368.

Vat dyestuffs of the anthraquinone series, manufacture.—A. Carpmael (I. G. Farbenindustrie). April 25, 1934. 437,598.

Soluble azo dyestuffs, manufacture and application.—Imperial Chemical Industries, Ltd., and A. H. Knight. April 25, 1934. 437,516.

Dyestuffs of the pyrone series, manufacture and production. Coutts and Co. and F. Johnson (I. G. Farbenindustrie). April 26, 1934. 437,600.

Aqueous vinyl resin dispersions or emulsions and their manufacture and use.—F. B. Dehn (Röhm and Haas A.-G.). April 26, 1934. 437,446.

Sheets from polymerisation products, manufacture.—W. W. Groves (Deutsche Celluloid-Fabrik). April 27, 1934. 437,604.

Acid dyestuffs of the anthraquinone series, manufacture and production.—J. Y. Johnson (I. G. Farbenindustrie). April 28, 1934. 437,382.

Alkali metal cyanides, manufacture.—E. I. du Pont de Nemours and Co. May 1, 1934. 437,614.

Glyoxylic acid, manufacture.—I. G. Farbenindustrie. May 4, 1933. 437,649.

Potassium sulphate, production.—A. E. Cashmore, I. L. Clifford, and Imperial Chemical Industries, Ltd. May 2, 1934. 437,652.

Organic sulphur compounds, manufacture.—E. I. du Pont de Nemours and Co. May 2, 1933. 437,653.

Cupriferous dyestuffs, manufacture.—I. G. Farbenindustrie. May 3, 1933. 437,657.

Articles from plastic compositions containing vinyl resins, production.—J. J. V. Armstrong (National Carbon Co., Inc.). May 4, 1934. 437,662.

Alkylamines, manufacture.—A. Carpmael (I. G. Farbenindustrie). May 5, 1934. 437,530.

Arylides from 4-hydroxydiphenyl-3-carboxylic acid and of azo dyestuffs therefrom, manufacture.—W. W. Groves (I. G. Farbenindustrie). May 7, 1934. 437,675.

Ammonium salts by the distillation of concentrated gas liquor, apparatus for production.—P. Parrish. May 30, 1934. 437,681.

Activated carbon, preparation and regeneration.—G. Cardile and E. Gardiol (trading as I.A.C. Industria Articoli Caoutchouc). Sept. 28, 1933. 437,400.

Simultaneously dewaxing and refining mineral oils, method. Aktiebolaget Separator-Nobel. Oct. 23, 1933. 437,483.

Vinyl type monohalides, treatment.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 19, 1934. 437,573.

Basic chromium sulphate free from iron and solutions thereof, manufacture.—J. R. Geigy A.-G. April 4, 1935. 437,497.

Applications for Patents

(October 31 to November 6 inclusive.)

Emulsification of tars, process.—E. Arnold, W. J. Chadder, H. M. Spiers, and Thermal, Industrial and Chemical Research Co., Ltd. 30165.

Generating ozone, etc., apparatus.—B. H. Auld. 30120.

Cellulose esters, manufacture.—H. A. Auden. 30075.

Resinous condensation products, preparation.—Beck, Koller and Co. (England), Ltd.). (Germany, Nov. 6, '34.) 30629.

Recovery of bromine, etc., from liquids containing bromides, etc., process.—E. Berl. 30407.

Azo dyestuffs, manufacture.—A. Carpmael (I. G. Farbenindustrie). 30272, 30273.

Polyazo dyestuffs, manufacture.—A. Carpmael (I. G. Farbenindustrie). 30460.

Black sulphur dyestuffs, manufacture.—A. Carpmael (I. G. Farbenindustrie). 30702.

Conversion of hydrocarbon oils, process.—C. E. Every-Clayton (Alco Products, Inc.) 30132.

Resin-like condensation products, manufacture.—Deutsche Hydrierwerke A.-G.). (Germany, Nov. 6, '34.) 30748.

Cellulose esters, manufacture.—Distillers Co., Ltd. H. M. Hutchinson and H. P. Staudinger. 30075.

Tetrahydronaphthylthioureas, etc.—E. I. du Pont de Nemours and Co. (United States, Nov. 3, '34.) 30257.

Zinc oxide, treatment.—A. G. Elliott. 30339.

Azo dyestuffs, manufacture.—J. R. Geigy A.-G. (Switzerland, Nov. 5, '34.) 30437.

Halogen-substituted alcohols, manufacture.—W. W. Groves (I. G. Farbenindustrie). 30323.

Water enriched with heavy water, production.—F. Hansgirg. (Austria, Dec. 6, '34.) 30500.

Distillation of carbonaceous material, apparatus.—H. J. Holford. 30326.

Nitro-azo dyestuffs containing metal, manufacture.—I. G. Farbenindustrie. (Germany, Nov. 6, '34.) 30617.

Hydrocarbon products from carbonaceous material, production.—International Hydrogenation Patents Co., Ltd. (Germany, Nov. 14, '34.) 30525.

Cyanhydrins, manufacture.—G. W. Johnson (I. G. Farbenindustrie). 30446.

Hydrogen peroxide, manufacture.—G. W. Johnson (I. G. Farbenindustrie). 30447.

Carbocyanine dyestuffs, manufacture.—G. W. Johnson (I. G. Farbenindustrie). 30674.

Vat dyestuffs, manufacture.—G. W. Johnson (I. G. Farbenindustrie). 30675, 30676, 30722.

Electrolytic deposition of lead peroxide.—Y. Kato. (Japan, Dec. 20, '34.) 30244.

ELECTROLYTIC DEPOSITION OF LEAD PEROXIDE.—Y. Kato. (Japan, April 4.) 30245.

METALLIC MAGNESIUM, apparatus for manufacture.—Y. Kato. (Japan, Jan. 11.) 30496.

COMPOUNDS OF THE CYANINE TYPE, production.—J. D. Kendall. (May 8, '34.) 30657.

CONTINUOUS NITRATION OF AROMATIC HYDROCARBONS, apparatus. J. Meissner. (Germany, Nov. 28, '34.) 30715.

THERMAL CONVERSION OF HYDROCARBONS, process.—Ruhrchemie A.-G. (Germany, March 18.) 30627.

ACETYLENE, manufacture.—Standard Oil Development Co. (United States, Dec. 29, '34.) 30056.

DERIVATIVES OF BARBITURIC ACID, production.—A. A. Thornton (Chemische Fabriken Dr. J. Wiernik and Co. A.-G.). 30205.

PROCESS FOR PROMOTING ADHESION between cellulose acetate and gelatine layers.—Triplex Safety Glass Co., Ltd., and T. Wilson. 30241.

GLAUCONITE, treatment.—United Water Softeners, Inc. (United States, Jan. 22.) 30621.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CUPRINOL, LTD., London, E.C., chemical mfrs. (M., 16/11/35.) Reg. Oct. 30, Trust Deed dated Oct. 11, 1935, securing £50,000 deb. stock of which it is proposed to issue immediately £30,000; general charge. *Nil. Nov. 5, 1934.

ELTON COP DYEING CO., LTD., Bury. (M., 16/11/35.) Reg. Nov. 1, £500 debs., part of £5,000 (not ex.) already reg. *£950. Dec. 18, 1934.

HARDWICK BY-PRODUCT CO., LTD., Holmewood, coal distillers, etc. (M., 16/11/35.) Reg. Nov. 5, £115,000 1st deb., to Westminster Bank, Ltd.; general charge. —*—. Apr. 11, 1935.

PINENE OZONIDE, LTD., London, W. (M., 16/11/35.) Reg. Nov. 1, series of £500 debs., present issue £100; general charge.

SOUTHERN SILICA, LTD., Melksham. (M., 16/11/35.) Reg. Oct. 30, £1,000 debs., part of a series already reg. *£9,150. Dec. 5, 1934.

Satisfactions

CHESHIRE UNITED SALT CO., LTD., London, E.C. (M.S., 16/11/35.) Satisfaction reg., Nov. 5, £35,000, reg. May 5, 1932.

HARDYPICK, LTD. (late Hardy Patent Pick Co., Ltd.), Sheffield. (M.S., 16/11/35.) Satisfaction reg. Nov. 4, £30,000, reg. Jan. 12, 1927.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

SENDELL, C. R. (male), Nightingale Works, 347 Hornsey Road, N., chemical mfr. (C.C., 16/11/35.) £18 12s. 0d. Oct. 8.

Company News

Ruths International Accumulators.—The report for 1934 states that the item in profit and loss account "profits on completed contracts," amounting to £5,360, arises from certain contracts booked before formation of, and association with, Ruths Area Accumulators in September, 1933. This profit, together with sundry other revenue items, brings total credit to £5,485; from this is deducted net figure of £2,917 for expenses, leaving balance £2,568; after crediting two items of non-recurring nature amounting to £2,347, the total available profit is £4,915, which is used to write down book value of patents, patent licences, etc.

A. Boake Roberts and Co.—A second interim dividend of 1½ per cent. net is announced on the ordinary shares.

Reckitt and Sons.—A quarterly payment of 1s. per share, payable on January 1 next, is announced. The total distribution for 1934 was 22½ per cent.

British Cyanides, Ltd.—The report for the year to September 30 last, states that the gross trading profit at £74,227 shows an increase of £15,150—or 26 per cent. over the previous year. After allocating £5,000, against £1,478, for depreciation reserve, the net figure is £5,669 higher at £26,674. The ordinary dividend is 8 per cent., less tax, compared with a previous payment, equivalent to 7.2 per cent. per annum, leaving £2,796 to be carried forward, against £2,288 brought in.

Imperial Smelting Corporation.—It is announced that the net profits declined from £154,984 to £145,428 in the year to June 30 last. With £33,126 brought in the available balance is £178,554. The dividend on the 6½ per cent. preference shares requires £134,538, leaving £44,016 carried forward.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Australia.—A firm of agents established at Melbourne and Sydney wish to obtain the representation, on a basis to be arranged, of United Kingdom manufacturers of chemists' sundries and goods used in hospitals and by the medical profession. (Ref. No. 430.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of Agriculture is calling for tenders, to be presented in Egypt by January 20, 1936, for the supply of nicotine sulphate. (Ref. T.Y. 147.)

New Dyestuffs

DISPERSOL NAVY BLUE RS PASTE represents the first homogeneous, dischargeable navy blue acetate silk dyestuff to be marketed. It is of special interest for the dyeing of acetate silk goods in self and, to a lesser extent, in compound shades for subsequent discharging for the production of white or coloured effects by the Formosul-calcium sulphocyanide or Formosul-zinc sulphocyanide process. Dispersol Navy Blue RS is suitable for dyeing all forms of acetate silk materials and, with the aid of a small quantity of Lissapol A, produces full navy blue shades which are of good fastness to light, washing and hot pressing and of very good fastness to alkalies and perspiration. It is also of interest to the dyer of knitted fabrics, to whom washing fastness is of importance. It possesses very good affinity for the acetate silk fibre when dyed in the presence of Turkey red oil or soap.

POLAR BRILLIANT RED 10B CONC., a product of J. R. Geigy Soc. An., in comparison with the older Polar Brilliant Red 5B Conc., is rather bluer and appreciably purer and brighter also being somewhat superior in fastness to light. The fastness to stoving and sulphite is very good. Like all polar colours, Polar Brilliant Red 10B Conc. can be used on wool and silk of all descriptions and on union material of these fibres (Gloria) when it is desired to obtain bright shades with good fastness to washing, water, milling, perspiration and sea water. The new colour dyes quite well from a neutral bath and withstands the action of chrome, which dulls the shade very slightly.

Ferro-Alloy Production in Canada

FERRO-ALLOYS production in Canada during 1934 amounted to 29,940 tons. Ferro-silicon was produced by five different plants and three concerns recovered small tonnages of ferro-solicon as a by-product from the manufacture of fused alumina, another company made 50, 75, and 90 per cent. grades, and another concern made 15, 50, 75, 85 and 90 per cent. grades; the latter company also made large tonnages of ferro-manganese and spiegeleisen. One of the pig iron producers made occasional runs of spiegeleisen in their blast furnace, and a chemical manufacturer made some ferro-phosphorus. Imports of ferro-alloys totalled 1,226 long tons at 247,783 dols. in 1934, as against 467 tons at 168,394 dols. in 1933.

International Citric Acid Agreement

THE international citric acid agreement concluded last year between Italy and the synthetic producers is valid for five years. The Italian industry received a sales quota of 38 per cent. The Government has undertaken to guarantee to producers of citric acid and citrate of lime the recently fixed minimum prices, through a system of premium payments. German citric acid exports, after gaining sharply in 1934 to 206 metric tons, valued at 196,000 marks, from only 16 tons valued at 23,000 marks in 1933, fell off heavily this year to 31 tons valued at 30,000 marks, in the first six months from 103 tons valued at 99,000 marks in the corresponding period last year.

Forthcoming Events

LONDON

Nov. 20.—Institution of Chemical Engineers. "The Evaporation of Water from Plane and Cylindrical Surfaces." Dr. Ezer Griffiths and R. W. Powell. 6 p.m. Burlington House, Piccadilly, London.

Nov. 20.—Electrodepositors' Technical Society. Autumn (Annual) Meeting. Presidential Address by E. A. Ollard. 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, London.

Nov. 21.—Borough Oil and Colour Students' Association. "Naphthenate Driers." M. D. Curwen. 7.30 p.m. Borough Polytechnic, Borough Road, London.

Nov. 21.—The Chemical Society. Discussion on "Some Aspects of the Interaction between Gases and Solids," opened by Dr. Eric K. Rideal. 8 p.m. Burlington House, Piccadilly, London.

Nov. 22.—Royal Institution. "A Musical Alchemist." Professor John Read. 9 p.m. 21 Albemarle Street, London.

BELFAST

Nov. 22.—Institute of Chemistry (Belfast Section). Charter Jubilee Dinner. Grand Central Hotel, Belfast.

BIRMINGHAM

Nov. 21.—The Institute of Vitreous Enamellers (Midland Section). "Settling and Antisettling Properties of Clays." F. H. Clews. 7.30 p.m. Chamber of Commerce, New Street, Birimngham.

BRADFORD

Nov. 21.—Society of Dyers and Colourists (West Riding Section). "Some Properties of the Lubricating Oil Film." J. E. Southcombe. Bradford.

CARDIFF

Nov. 22.—The Chemical Society. Discussion on "Some Problems of Sugar Chemistry in Relation to Biology," opened by Professor W. N. Haworth and Dr. E. L. Hirst. 5 p.m. University College, Cardiff.

EDINBURGH

Nov. 19.—Institute of Brewing (Scottish Section). "Oxidation, Reduction and Brewing." Dr. I. A. Preece. Caledonian Hotel, Edinburgh.

GLASGOW

Nov. 20.—Alchemists' Club. "Some Colouring Matters of Micro-organisms." A. R. Todd. 7.30 p.m. University, Glasgow.

Nov. 22.—Andersonian Chemical Society. "The Chemist and the Farmer." Professor D. N. McArthur. 3 p.m. Royal Technical College, Glasgow.

Nov. 22.—British Association of Chemists (Scottish Section). "Heat Saving in a Tar Work." R. G. W. Eadie. 7.30 p.m. MacKay's Hotel, Glassford Street, Glasgow.

HUDDERSFIELD

Nov. 19.—Society of Dyers and Colourists (Huddersfield Section). "The Finishing of Woollens in Re'ation to Dyeing." H. Hardy. Huddersfield.

HULL

Nov. 19.—Society of Chemical Industry (Yorkshire Section). Joint meeting with the Hull Chemical and Engineering Society. "A New Kjeldahl Method for the Determination of Nitrogen in Foods, Feeding Stuffs, Leather, etc." A. E. Beet, and D. G. Furzey; "A Vacuum Percussion Disintegrator and its Use for the Separation of Plant remains from Coal." J. C. McCrae and A. M. Wardless. 7 p.m. Municipal Technical College, Park Street, Hull.

LIVERPOOL

Nov. 21.—Society of Chemical Industry (Liverpool Section). "The Scientific Aspect of Tobacco Manufacture." Dr. H. H. Evers. 6 p.m. City Technical College, Byrom Street, Liverpool.

LEEDS

Nov. 20.—Society of Glass Technology. The University. 2 p.m. Leeds.

NOTTINGHAM

Nov. 21.—Society of Chemical Industry (Nottingham Section). Notes by Members on Some Apparatus and Methods used in Analysis. A. D. Powell and W. Woodhouse. 7.30 p.m. University College, Nottingham.

MANCHESTER

Nov. 18.—Institution of the Rubber Industry (Manchester Section). "Rubber Derivatives." Dr. P. Schidrowitz. 7 p.m. 17 Albert Square, Manchester.

New Companies Registered

H. E. Newton and Co., Ltd., 9 Lord Street, Ashton-under-Lyne.—Private company. Registered November 6. Nominal capital £10,000. Refiners, distillers, and manufacturers, importers and exporters of, agents for and dealers in oils, fats, waxes, pitch, resins, gums, coal tar and derivatives thereof, etc. Directors: Horace E. Newton, John F. Miller.

Standard Essence Co. (Ireland), Ltd., 5 Iveleary Road, Whitehall, Dublin.—Registered in Dublin, November 4. Nominal capital £2,000. Manufacturing chemists, distillers of and dealers in flavouring and other essences, makers of and dealers in colours, pharmaceutical, chemical and industrial and other preparations, etc. Directors: Joseph Rogers, Raymond J. Harris, Walter Watts.

Books Received

Handbook of Chemistry and Physics. Edited by Charles D. Hodgman. Cleveland, Ohio: Chemical Rubber Publishing Co. Pp. 1951. $6.

Die Bierhefe als Heil-, Nahr- und Futtermittel. By Dr. Julius Schulein. Dresden and Leipzig: Verlag von Theodor Steinkopff. Pp. 200. RM.10.

Journal of the Institute of Brewing, Collective Index, 1924-34. London: Institute of Brewing. Pp. 231.